

Ancient Indian History & Archeology(Ph.D)

1. Chopper/Chopping tools were introduced in the:
(A) Palaeolithic period (B) Mesolithic period
(C) Neolithic period (D) Chalcolithic period
2. Mehargarh is situated in :
(A) Rajasthan (B) Baluchistan (C) Orissa (D) Bihar
3. Rouletted ware was excavated at :
(A) Chirand (B) Arikamedu (C) Tilwara (D) Maski
4. Naikund is a site of :
(A) Harappan period (B) Mauryan period
(C) Chalcolithic period (D) Megalithic period
5. Brahmagiri was excavated by:
(A) R.E.M. Wheeler (B) B.K. Thapar (C) John Marshall (D) R.S. Bisht
6. Which of the following is not a Harappan site?
(A) Lothal (B) Banawali (C) Taxila (D) Shortugai
7. Hastinapur was excavated by:
(A) B.B. Lal (B) G.B. Sharma (C) M.K. Dhavalikar (D) V.N. Misra
8. S – profile vases are associated with:
(A) Neolithic period (B) Megalithic period
(C) Harappan period (D) Kushan period
9. Which Ashokan Rock edict is situated in Rajasthan?
(A) Hathigumpha (B) Bhabru (C) Girnar (D) Maski
10. Lunate or Crescent is a:
(A) Neolithic tool- type (B) Harappan tool-type
(C) Mesolithic tool-type (D) Paleolithic tool-type
11. The capital of Anga was:
(A) Champa (B) Ahichhatra (C) Ujjain (D) Kaushambi
12. Anathapindika was a:
(A) Physican (B) Gahapati (C) Sailor (D) Potter

13. The earliest occupational level of Taxila is:
 (A) Sirsukh (B) Sirkap (C) Bhir Mound (D) None of these
14. Which literary work is not attributed to Harsha?
 (A) Ratnavali (B) Priyadarshika (C) Nagananda (D) Harshacharita
15. Who founded the Pala dynasty?
 (A) Gopala (B) Harichandra (C) Dantivarman (D) Vijayalaya
16. Moggaliputta Tissa presided over the :
 (A) 1st Buddhist council (B) 2nd Buddhist council
 (C) 3rd Buddhist council (D) 4th Buddhist council
17. *Mahabhasya* was authored by:
 (A) Panini (B) Patanjali (C) Kalhana (D) Banabhatta
18. Rabatak inscription was found in:
 (A) Malaysia (B) Sri Lanka (C) Pakistan (D) Afghanistan
19. Azes I and Azes II were
 (A) Saka rulers (B) Parthian rulers (C) Huna rulers (D) Kushana rulers
20. *Padavratta* was a term used by Vakataks as:
 (A) A monetary unit (B) Toll tax
 (C) Land measurement unit (D) Irrigation tax
21. The Guptas were:
 (A) Vaishnava rulers (B) Shaiva rulers
 (C) Buddhist rulers (D) Jain rulers
22. Ajanta rock-cut architecture is in the form of:
 (A) Viharas (B) Chaityas (C) Viharas (D) None of these
23. The port-town of Tamralipti or Tamruk was situated in:
 (A) Orissa (B) Karnataka (C) West Bengal (D) Kerala
24. The Sanskrit play *Mudra-rakshasa* was written by:
 (A) Vishakhaddatta (B) Kalidasa (C) Shudraka (D) Bhasa
25. Who devised the box-grid excavation method?
 (A) R.E. M Wheeler (B) B. B. Lal
 (C) H.D. Sankalia (D) Alexander Cunningham
26. The study of relation between variables is:
 (A) Descriptive study (B) Experimental study
 (C) Correlational study (D) Data study
27. Archives are:
 (A) Oral narratives (B) Historical documents
 (C) Ethnographic records (D) Archaeological material

28. Who wrote *What is History*?
 (A) Lucian Febvre (B) C.J. Thompson (C) E.H. Carr (D) Marc Bloch
29. Quotations require a:
 (A) Footnote (B) Abbreviation (C) An example (D) Diacritical mark
30. *Op. cit* means:
 (A) In the work already cited (B) In the place
 (C) In the sequence (D) And the above
31. *Et seq* signifies:
 (A) And the following (B) In the sequence
 (C) In the place (D) And the above
32. A glyph added to a letter is a :
 (A) Diacritic (B) Logo (C) Sign (D) None of these
33. Index is:
 (A) In the beginning of a text (B) At the end of a text
 (C) On the cover of a text (D) In the middle of a text
34. Palaeography is the study of :
 (A) Coins (B) Monuments (C) Scripts (D) Pottery
35. Quantitative research involves the use of:
 (A) Statistics (B) Microbiology (C) Geology (D) Sociology
36. Observational research can be used in:
 (A) Ethnoarchaeology (B) Palaentology
 (C) Palacoanthropology (D) Mathematics
37. Who wrote *The Idea of History*?
 (A) Karl Merx (B) F. Braudel (C) R.G. Collingwood (D) A. Toynbee
38. Quantitative research is :
 (A) Objective (B) Subjective (C) Neither (D) Both
39. Subdivided bar diagram is:
 (A) Pie diagram (B) Histogram
 (C) Component bar diagram (D) Bar diagram
40. Which is the first step in research process?
 (A) Development of a hypothesis (B) Preparation of index
 (C) Formulation of research problem (D) Preparation of bibliography

41. Who wrote *The Historians Craft*?
 (A) Mare Bloch (B) Lewis Binford (C) Oswald Spengler (D) A.L. Kroeber
42. Synopsis is:
 (A) An abstract (B) A research proposal
 (C) An epilogue (D) A prologue
43. Bibliography is arranged:
 (A) Randomly (B) According to publication year
 (C) Alphabetically (D) Logically
44. William Jones is associated with:
 (A) Marxism (B) Structuralism (C) Orientalism (D) Modernism
45. Which scholar is associated with Subaltern studies?
 (A) Ranajit Guha (B) Romila Thapar (C) D.N. Jha (D) R.S. Sharma
46. Who wrote *The Personality of India*?
 (A) F.R. Allchin (B) S. Piggot (C) R.L. Singh (D) B. Subbarao
47. Who wrote *The Position of Women in Hindu Civilization*?
 (A) A.S. Altekar (B) H.C. Raychaudhery
 (C) B. N. Mukherjee (D) James Mill
48. V.S. Wakankar is credited with discovery of:
 (A) Harappan Civilization (B) Bara culture
 (C) Bhimbetka rock art (D) PGW culture
49. The main types of empirical research are:
 (A) Qualitative and quantitative (B) Systematic
 (C) Deductive reasoning (D) None of these
50. *Et al.* means:
 (A) And others (B) Single author (C) Rewrite (D) Reset

x-x-x

Economics(Ph.D.)

1. What is the first step in research?
(A) Selecting a problem (B) Identifying a Problem
(C) Explaining a Problem (D) Defining a problem
2. What of the following statements are associated with alternative hypothesis?
(A) there is no significant difference between the variables
(B) It is characterized as H_0
(C) It is characterized as H_1
(D) It signifies the absence of an effect or relation between variables
3. Which of the following is a type of non-probability sampling?
(A) Quota Sampling (B) Cluster Sampling
(C) Systematic Sampling (D) Stratified Sampling
4. Which of the following is a qualitative summarisation of evidence on a topic in the research process?
(A) Bibliography (B) Introduction (C) Literature review (D) Annexure
5. What is a specific value calculated from sample called?
(A) Estimator (B) Bias (C) Estimation (D) Estimate
6. What does 95% Level of Confidence mean?
(A) 5% chance of being wrong (B) 5% chance of being correct
(C) 95% chance of being wrong (D) None of these
7. After placing certain restrictions upon the data, the number of values that are free to vary called as:
(A) Confidence limits (B) Degrees of Freedom
(C) Number of parameters (D) Free Estimators
8. ANOVA stands for:
(A) A normally organized variance analysis
(B) Analysis of Variance
(C) Analysis of Value Addition
(D) Another observed Variation
9. 'When the sample size tends to infinity, the sample mean will be normally distributed'. What is this called?
(A) Central Limit Theorem (B) Law of Proportionality
(C) Law of large numbers (D) Mean theorem
10. If all the units in the population have an equal chance of being selected, what is the sampling technique called?
(A) Quota Sampling (B) Judgmental Sampling
(C) Probability Sampling (D) Convenience Sampling
11. Which of the following is not a feature of a good questionnaire?
(A) Inconsistency (B) Simplicity (C) Objectivity (D) Conciseness

12. Which of the following best defines Correlation Analysis?
 (A) Dependence among variables (B) Association among Variables
 (C) Variations among Variables (D) Difference among variables
13. Which measure of central tendency is suitable for skewed data?
 (A) Median (B) Mean
 (C) Standard deviation (D) Mode
14. MoSPI stands for:
 (A) Ministry of Socio-Physiological Innovation
 (B) Management organisation of Statistical Programme Implementation
 (C) Ministry of Statistics and Programme Implementation
 (D) Methodology of Statistical Planning Implementation
15. In which of the following cases qualitative research is more appropriate?
 (A) Numerical data (B) Structured data
 (C) Descriptive data (D) None of these
16. What is the main purpose of conducting a literature review in research?
 (A) To find a topic for the research
 (B) To summarise the research findings
 (C) To identify gaps in the existing knowledge
 (D) To collect data for the study
17. Which of the following best describes the data analysis stage of research?
 (A) Collecting raw data from participants
 (B) Applying statistical or thematic techniques to interpret data
 (C) Reviewing existing literature on the topic
 (D) Formulating hypotheses based on data
18. Which of the following is an ethical consideration in the data collection stage?
 (A) Selecting a research topic
 (B) Obtaining informed consent from participants
 (C) Analysing data accurately
 (D) Reviewing existing literature
19. The process of listing all the in-text citations at the end of a paper is known as:
 (A) Bibliography (B) Footnote (C) References (D) None of these
20. Which of the following is not a part of data processing?
 (A) Identifying research gaps (B) Editing
 (C) Coding (D) None of these
21. Which of the following is a factor on which sample size depends:
 (A) Nature of study (B) Type of sampling
 (C) Time and cost (D) All of these
22. Which of the following test is considered suitable for small normally distributed sample:
 (A) Z-test (B) Chi-Square Test
 (C) t-test (D) Mann-Whitney U Test

34. Who gave the Theory of Comparative Advantage for trade?
 (A) David Ricardo (B) Adam Smith (C) Eli Hecksher (D) Bertil Ohlin
35. Which of the following economist(s) is associated with the 'dual economy model'?
 (A) T. Schultz (B) G. Ranis and J.C.H. Fei
 (C) J. W. Mellor (D) H. Todaro
36. Which of the following statements is incorrect in the context of Gini Coefficient?
 (A) It is a measure of inequality (B) It varies between 0 and infinity
 (C) A higher value indicates greater inequality (D) It is a measure of dispersion
37. Which one of the following is a Kharif crop?
 (A) Bajra (B) Wheat (C) Mustard (D) Parle
38. Which of the following is a type of expansionary Monetary Policy?
 (A) Raising the cash reserve requirements (B) Reducing the Statutory Liquidity Ratio
 (C) Increasing the Repo Rate (D) Increasing the Reverse Repo Rate
39. Which of the following is correct about industrial concentration as measured by the Hirschman Herfindahl Index (HHI)?
 (A) A higher HHI implies lower concentration
 (B) The HHI takes the squares of the individual market share of each firm
 (C) It ranges from 0 to 100
 (D) It takes into account the largest 8 firms in the industry, as per their market shares
40. Which of the following does not have an operational target under the Fiscal Responsibility and Budget Management Act?
 (A) Revenue Deficit (B) Primary Deficit
 (C) Fiscal Deficit (D) Debt to GDP Ratio
41. If the nominal interest rate is 10% and the real of inflation is 7%, then the real rate of interest will be?
 (A) 3% (B) 17% (C) 0.7% (D) 3.5%
42. What is the range of the Marginal Propensity to Consume?
 (A) 0 to 1 (B) 0 to infinity (C) 0 to 100 (D) -1 to 1
43. What is the elasticity of demand when the demand curve is in the shape of a rectangular hyperbola?
 (A) 0 (B) 1 (C) Infinity (D) -1
44. What is NAIRU?
 (A) The theoretical level of inflation above which unemployment is expected to fall
 (B) The theoretical level of unemployment below which inflation is expected to rise
 (C) The theoretical level of inflation below which unemployment is expected to rise
 (D) The theoretical level of unemployment above which inflation is expected to fall
45. Which of the following statements about the NITI AAYOG is incorrect?
 (A) It replaced the Planning Commission
 (B) It is a Non-Constitutional Body

- (C) It is located in New Delhi
(D) It is responsible for formulating and implementing the Central Sector Schemes
46. In a regression model, what problem arises when the values in the data set are correlated with their values in a previous time period?
(A) Multicollinearity (B) Heteroscedasticity (C) Autocorrelation (D) Non-Stationarity
47. What is the pricing practice called when a firm tries to extract the entire consumer surplus by charging each consumer their reserve price?
(A) Price Differentiation (B) First Degree Price Discrimination
(C) Second Degree Price Discrimination (D) Third Degree Price Discrimination
48. Which of the following statements are incorrect?
(A) The kinked-demand curve is a case of price rigidity
(B) The firm is a price taker under perfect competition
(C) Normal Profits imply zero economic profit
(D) A monopolist can only earn super-normal profits
49. What happens when the technical progress is capital deepening?
(A) The capital to labour ratio is rising
(B) The capital to labour ratio is constant
(C) The labour to capital ratio is rising
(D) The capital to labour ratio is falling
50. Which of the following is not a canon of taxation?
(A) Equity (B) Certainty (C) Convenience (D) Development

x-x-x

Gandhian & Peace Studies(Ph.D.)

1. What is the name of the conceptual framework in which the research is carried out?
(A) Research Design (B) Research Paradigm
(C) Synopsis of Research (D) Research Hypothesis
2. Schedule is used as a
(A) Questionnaire (B) Tool (C) Method (D) Technique
3. Research is basically
Option (i) A methodology of enquiry
Option (ii) Search of Truth
Option (iii) A Systematic exploration of facts
Option (iv) All of the above

Select the correct option/s
(A) Option (i) and Option (ii) are correct (B) Option (ii) and Option (iii) are correct
(C) Option (i) and Option (iii) are correct (D) Option (i), (ii), (iii) and (iv) are correct
4. In research process, a researcher should at first find:
(A) Fact (B) Value (C) Research Problem (D) None of these
5. Questions which allow only limited or a few alternative ways of answering is called:
(A) Open ended questions (B) Unstructured questions
(C) Structural questions (D) Dichotomous questions
6. Random sampling is helpful as it is:
Option (i) Reasonably accurate
Option (ii) Free from personal biases
Option (iii) An economical method of data collection
Option (iv) All the above
Select the correct Option/s
(A) Option (i) and Option (iii) are correct (B) Option (ii) and Option (iii) are correct
(C) Option (i), (ii), (iii) and (iv) are correct (D) Option (i) and Option (ii) are correct
7. _____ is a preferred sampling method for the population with finite size
(A) Systematic sampling (B) Purposive sampling
(C) Cluster sampling (D) Area sampling
8. Testing hypothesis is a
(A) Inferential statistics (B) Descriptive statistics
(C) Data preparation (D) Data Analysis
9. In which of the following methodology of research, hypotheses are usually implied rather than being explicit?
(A) Experimental method (B) Descriptive survey method
(C) Ex-post facto method (D) Historical method

10. Quantitative research is otherwise known as
 (A) Structured approach (B) Ethnographic approach
 (C) Unstructured approach (D) Descriptive approach
11. Social Science Research can be defined as:
 Option (i) Verifying old facts
 Option (ii) Discovering new facts
 Option (iii) To enhance self confidence
 Option (iv) To get credits
 Select the correct option/s
 (A) Option (i) and Option (iii) are correct (B) Option (ii) and Option (iv) are Correct
 (C) Option (i) and Option (ii) are Correct (D) Option (iii) and Option (iv) are correct
12. Second step in problem formulation is:
 (A) Survey (B) Discussion
 (C) Statement of the Problem (D) Understanding the nature of the problem
13. Question which seeks information is called:
 (A) Opinion question (B) Hypothetical question
 (C) Factual Question (D) Marginal question
14. If someone wants to give training in use of statistical package for social sciences like SPSS to the researchers, for this which option is best suitable here:
 (A) Lecture (B) Workshop (C) Seminar (D) Conference
15. To test null hypothesis, a researcher uses:
 (A) T test (B) ANOVA (C) X^2 (D) Factorial analysis
16. Bibliography given in a research report shows:
 (A) Helps those interested in further research
 (B) Has no relevance to research problem
 (C) Show vast knowledge of the researcher
 (D) All of the above
17. The research which is exploring new facts through the study of the past is called:
 (A) Mythological research (B) Philosophical research
 (C) Historical research (D) Table research
18. The process not needed in experimental research is:
 (A) Reference collection (B) Controlling
 (C) Manipulation and replication (D) Observation
19. Which of the following sampling method is appropriate to study the pattern of disease amongst male and female in India let us assume of the years 1919, 1929, 1939 and 1949?
 (A) Cluster sampling (B) Systematic sampling
 (C) Quota sampling (D) Stratified random sampling

20. We need to review the existing literature to:
- (A) To make sure you have a long list of references
 - (B) Because without it, you could never reach the required word-count
 - (C) To find out what is already known about your area of interest
 - (D) To help in your general studying
21. What are the core elements of a research process?
- (A) Introduction; Data Collection; Data Analysis; Conclusions and Recommendations
 - (B) Research Plan; Research Data; Analysis; References
 - (C) Executive Summary; Literature Review; Data Gathering; Conclusions; Bibliography
 - (D) Introduction; Literature Review; research Methodology; Results; Discussions and Conclusions
22. Which of the following is true regarding research objectives?
- (A) Research objectives, when achieved, will provide sufficient earnings to obtain a reasonable return on investment
 - (B) Research objectives, when obtained, will ensure the viability of the marketing research department
 - (C) Research objectives, when achieved, provide the information to solve the problem
 - (D) Research objectives are seldom achieved but should be stated as goals to be sought
23. A _____ is a subject of a _____
- (A) Sample, Population
 - (B) Population, Sample
 - (C) Statistic, Parameter
 - (D) Parameter, Statistic
24. The method by which a sample is chosen
- (A) Unit
 - (B) Design
 - (C) Random
 - (D) Census
25. How to judge the depth of any research?
- (A) By research title
 - (B) By research duration
 - (C) By research objectives
 - (D) By total expenditure on research
26. “The medium of instruction should be the mother tongue” resolution was passed by:
- (A) Niti Aayog
 - (B) Wardha Scheme
 - (C) CBSE
 - (D) Hartog Committee
27. Which system of education was propounded by Mahatma Gandhi?
- Option (i) Teaching by activities
 - Option (ii) Teaching through listening, meditation
 - Option (iii) Teaching through music
 - Option (iv) Teaching through sports
 - (A) Option (i), (ii) and (iii) are correct
 - (B) Option (ii) and (iii) are correct
 - (C) None of the above
 - (D) All the options are correct
28. Who among the following was political mentor of Mahatma Gandhi?
- (A) Swami Vivekananda
 - (B) Gopal Krishna Gokhale
 - (C) Ravinder Nath Tagore
 - (D) Pherozeshah Mehta

29. The non-cooperation movement was called off by Gandhi after the incident of
 (A) Jallianwala Bagh Massacre (B) Rowlatt Act
 (C) Chauri Chaura (D) Arrest of Gandhi ji
30. From where Gandhi started his Salt Satyagraha?
 (A) Dandi (B) Sabarmati (C) Sevagram (D) Champaran
31. In Which year Satyagraha Ashram was founded by Gandhi?
 (A) 1915 (B) 1916 (C) 1917 (D) 1919
32. The title of 'Bapu/Father of the Nation' was given to Gandhi by:
 (A) Ravinder Nath Tagore (B) G. K. Gokhale
 (C) Jawahar Lal Nehru (D) Subash Chandra Bose
33. On which day of March 1930, the famous Dandi March launched by Gandhi?
 (A) Tenth (B) Eleventh (C) Twelfth (D) Thirteenth
34. Who is the author of 'Unto This Last'?
 (A) Ruskin Bond (B) Louis Fisher (C) Leo Tolstoy (D) John Ruskin
35. Which of the following statement/s is/are correct according to Gandhi?
Option 'I' Learning should provide opportunities for children to become physically active.
Option 'II' Children should have the freedom to create their own models of knowledge about the world.
 (A) Only I (B) Only II (C) Both I and II (D) Neither I nor II
36. Gandhi's idea of village Sarvodaya implied that an ideal village must fulfil certain conditions. Which of the following is NOT among those conditions?
 (A) The caste system should be abolished
 (B) The places of worship should be built beside each other to develop a sense of brotherhood
 (C) It should have a dharamshala and a small dispensary
 (D) It should be self-sufficient in matters of food and clothing
37. What was/were the formative influence(s) on the philosophy of Mahatma Gandhi?
 Option (i) Gandhi was influenced by the 18th Century Pranami Sect that advocated the unity of faiths
 Option (ii) Gandhi was influenced by the Theosophists
 Option (iii) Gandhi was an admirer of the writings of Romantics like Wordsworth
 Select the correct answer using the code given below:
 (A) Option (i) and (ii) only (B) Option (ii) and (iii) only
 (C) Option (i), (ii) and (iii) (D) Option (i) only
38. The first living community established by Gandhi in South Africa was:
 (A) Sabarmati (B) Natal (C) Tolstoy (D) Phoenix
39. The first book written by Gandhi was
 (A) Letter to a Hindu
 (B) Hind Swaraj

- (C) An Autobiography or The Story of My Experiments With Truth
(D) Satyagraha
40. While holding a first-class ticket Gandhi was ordered by a railway official to shift to the 3rd class compartment. On his refusal to comply with the unjust order, a constable was called to push him put with bag and baggage. Identify the railway station where this incident took place.
(A) Natal (B) Johannesburg (C) Maritzburg (D) Durban
41. The differences with Gandhi led Subhas Chandra Bose to resign the Presidentship of the India National Congress in 1939. Leaving the Congress he formed a new party called _____
(A) Indian National Party (B) Indian Congress Freedom Bloc
(C) Forward Bloc (D) Freedom Bloc
42. Who inspired Gandhi with 'Ram Nam' in his childhood?
(A) Rambha (B) Putlibai (C) Kasturba (D) Laxmi
43. Who asked Gandhi to eat meat in order to become strong?
(A) Karsan Das (B) Uka (C) Lakshmi Das (D) Sheikh Mehtab
44. After the attainment of political independence in 1947, Gandhi ji felt that the Congress, as a propaganda vehicle and a parliamentary machine, had outlived its usefulness. So, to keep the Congress away from unhealthy competition with political parties and communal bodies, Gandhi ji towards the end of January 1948, sketched a draft constitution for the Congress to transform itself into _____.
(A) People's Forum (B) Lok Kalyan Sangh
(C) Lok Sevak Sangh (D) Lok Samiti
45. Which of the following did Gandhi described as his two lungs?
(A) Ahimsa and Peace (B) Brahamcharya and Aparigriha
(C) Truth and Peace (D) Ahimsa and Truth
46. Who described Gandhi's march to Dandi in the following words "Like the historic march of Ramchandra to Lanka, the march of Gandhi will be memorable"?
(A) Jawaharlal Nehru (B) Motilal Nehru (C) Sarojini Naidu (D) Sardar Patel
47. Identify the leader who has met Gandhi for about an hour and left him just a few minutes before he was shot dead on January 30, 1948 while on his way to the prayer meeting.
(A) Jawaharlal Nehru (B) Vallabhbhai Patel
(C) Sarojini Naidu (D) Vinoba Bhave
48. Who among the following was nominated as first Satyagrahi by Mahatma Gandhi for the Individual Satyagraha of 1940?
(A) Jawaharlal Nehru (B) Subhash Chander Bose
(C) Vallabhbhai Patel (D) Vinoba Bhave
49. _____ was awarded the 'Kaiswe-I-Hind' in 1915 by Lord Hardinge of Penshurst for his contribution to ambulance services in South Africa?
(A) Subhash Chandra Bose (B) Mahatma Gandhi
(C) Ravinder Nath Tagore (D) Bal Gangadhar Tilak
50. Mahatma Gandhi returned to India in the year _____ after two decades of residence abroad?
(A) 1893 (B) 1905 (C) 1906 (D) 1915

Political Science(Ph.D.)

1. Which of the following is a key characteristic of a good research question?
(A) It is broad and open-ended
(B) It can be answered with a simple "yes" or "no"
(C) It is specific and focused
(D) It is general and clear
2. In research, what is a hypothesis?
(A) A detailed plan of how to conduct a research study
(B) A tentative statement about the relationship between two or more variables
(C) The final outcome of the research
(D) A review of existing literature
3. Which of the following best describes a qualitative research method?
(A) It involves numerical data and statistical analysis
(B) It uses structured surveys and questionnaires
(C) It involves in-depth understanding of human behaviour and the reasons that govern such behaviour
(D) It emphasizes objective measurements and the statistical, mathematical, or numerical analysis of data
4. What is the purpose of a literature review in research?
(A) To develop a new hypothesis
(B) To gather primary data
(C) To identify gaps in current knowledge
(D) To design the research methodology
5. The hallmarks of qualitative methodology are:
(A) Ethnography and Grounded understanding
(B) Sample survey and empirical generalisations
(C) Both (A) and (B)
(D) Neither (A) nor (B)
6. The process of determining the relationship between two or more variables is called:
(A) Correlation
(B) Regression
(C) Hypothesis testing
(D) Descriptive statistics
7. Which of the following is the first step in the research process?
(A) Formulating the hypothesis
(B) Reviewing the literature
(C) Defining the research problem
(D) Collecting data
8. What is the main objective of descriptive research?
(A) To test hypotheses
(B) To explore cause-and-effect relationships
(C) To describe characteristics of a population or phenomenon
(D) To develop new theories

9. Which of the following methods is most suitable for studying large populations?
 (A) Case study (B) Survey (C) Experiment (D) Ethnography
10. Which of the following is an example of a secondary data source?
 (A) Conducting an interview (B) Administering a questionnaire
 (C) Reviewing a journal article (D) Performing an experiment
11. Which of the following is not a type of research?
 (A) Descriptive research (B) Exploratory research
 (C) Explanatory research (D) Deductive research
12. COPE is an acronym for –
 (A) Committee on publication ethics
 (B) Committee of publication ethics
 (C) Committee on publisher ethics
 (D) None of the above
13. The primary purpose of plagiarism detection software is to:
 (A) Prevent plagiarism
 (B) Generate a similarity index to check originality
 (C) Provide detailed feedback on citation issues
 (D) None of the above
14. The process of selecting a subset from a larger population to generalize findings is known as:
 (A) Sampling (B) Hypothesis testing
 (C) Validity (D) Reliability
15. A research question that can be answered with a "yes" or "no" is called:
 (A) Open-ended question (B) Closed-ended question
 (C) Dichotomous question (D) Leading question
16. The process of ensuring that the results of a study are consistent over time and across different situations is called:
 (A) Reliability (B) Validity (C) Objectivity (D) Generalizability
17. The researcher's role in a qualitative research study is primarily to:
 (A) Remain objective and detached (B) Actively engage with participants
 (C) Analyze numerical data (D) Test hypotheses
18. Which of the following is not a common type of sampling method?
 (A) Convenience sampling (B) Purposive sampling
 (C) Snowball sampling (D) Stratified random sampling
19. What is a bottom-up approach to research?
 (A) Deductive method (B) Explanatory method
 (C) Inductive method (D) None of these

20. Which of the following is not a common ethical consideration in research?
 (A) Informed consent (B) Confidentiality
 (C) Deception (D) Randomization
21. In a research study, the concept that represents the underlying theoretical idea being tested is known as the:
 (A) Dependent variable (B) Operational definition
 (C) Construct validity (D) Conceptual framework
22. Which of the following is not a common limitation of survey research?
 (A) Social desirability bias
 (B) Lack of control over the research environment
 (C) Inability to establish causal relationships
 (D) High response rates
23. Reusing your own previously published work without citation is known as:
 (A) Plagiarism (B) Self-plagiarism (C) Paraphrasing (D) Summarizing
24. Which of the following is not a primary data collection method?
 (A) Interviews (B) Surveys (C) Focus groups (D) Literature review
25. Which of these statements about ISSN numbers is NOT correct?
 (A) ISSN numbers are assigned by national ISSN centres worldwide
 (B) ISSN numbers are 8 digits long, with a hyphen after the 4th digit
 (C) ISSN numbers are only assigned to print journal publications
 (D) ISSN numbers help distinguish between different editions/versions of a journal
26. Which of the following regarding the ordinance-making power of the Governor is not correct?
 (A) It is not a discretionary power.
 (B) The Governor may withdraw the ordinance at any time.
 (C) The ordinance power can be exercised when the Legislature is not in session.
 (D) The aid and advice of ministers are not required for declaring the ordinance.
27. Who among the following gave a call for 'total revolution'?
 (A) Mahatma Gandhi (B) M.N. Roy
 (C) Jayaprakash Narayan (D) Acharya Vinoba Bhave
28. Parochial political culture is generally found in:
 (A) Developing Societies (B) Societies having a multi-party system
 (C) Developed societies (D) Monarchical societies

29. Who has criticized natural rights as ‘figurative nonsense’, ‘nonsense on crutches’, and ‘figurative meaningless’?
 (A) Herbert Spencer (B) Karl Popper (C) Hobbes (D) Jeremy Bentham
30. Who said, “The danger is not that a particular class is unfit to govern. Every class is unfit to govern”?
 (A) Lord Acton (B) Aristotle (C) Pareto (D) Hitler
31. Which of the following is not matched correctly regarding the various statehood demands in India?
 (A) Harit Pradesh: Western Uttar Pradesh (B) Bodoland: Northern Assam
 (C) Gorkhaland: Northern West Bengal (D) Vidarbha: Bihar
32. Consider the following statements:
 1. Under Article 32 of the Constitution of India public interest litigation is filed in the Supreme Court
 2. Under Article 226 of the Constitution of India public interest litigation is filed in the High Court
 3. PIL cannot be filed in district court
 4. The concept of PIL was developed in India
- Choose the correct answer using the codes given below.
 (A) All of the above (B) 1, 2 and 3 only (C) 1 and 2 only (D) 3 and 4 only
33. The difference between sex and gender is:
 (A) Sex refers to biological characteristics, while gender refers to socially constructed roles, behaviours, and identities.
 (B) Sex and gender are interchangeable terms and have the same meaning.
 (C) Sex refers to gender identity, while gender refers to biological differences between males and females.
 (D) Sex refers to reproductive organs, while gender refers to sexual orientation.
34. Who introduced the concept of three generation of Human Rights?
 (A) John Locke (B) Jeremy Bentham
 (C) Hannah Arendt (D) Karel Vasak
35. Match List-I with List-II and select the correct answer from the codes given below:
- | <u>List-I</u> | <u>List - II</u> |
|--|------------------|
| a. Justice as one person, one duty, one class and one work | 1. Plato |
| b. Justice as fairness | 2. Aristotle |
| c. Justice as proportionate equality | 3. John Rawls |
| d. Justice as the interest of the stronger | 4. Thrasymachus |
- Codes:

	a	b	c	d
(A)	1	2	3	4
(B)	2	1	3	4
(C)	2	1	4	3
(D)	1	3	2	4

- 36.** Which among the following is not associated with multiculturalism?
 (A) Bhiku Parekh (B) Will Kymlicka
 (C) James Tully (D) Jacques Derrida
- 37.** Asymmetrical globalisation is:
 (A) The way in which contemporary globalization is equally experienced across the world and among different social groups.
 (B) The way in which contemporary globalization is unequally experienced across the world and among different social groups.
 (C) The degree to which networks or patterns of social interactions are formally constituted as organizations with specific purposes.
 (D) None of the above.
- 38.** Which countries continue to host the majority of Afghan refugees globally, providing them with access to health and education services?
 (A) Turkey and Syria (B) Iran and Pakistan
 (C) Lebanon and Egypt (D) None of these
- 39.** Which of the following countries joined BRICS group on February 1st, 2024?
 (A) Argentina, Iran, Pakistan, Italy and Australia
 (B) Argentina, Iran, Saudi Arabia, Egypt and Indonesia
 (C) Argentina, Iran, Russia, China and Italy
 (D) None of the above
- 40.** When was first Women Reservation Bill introduce in the Indian Parliament?
 (A) 1990 (B) 1995 (C) 1996 (D) 2001
- 41.** Which Article of the Indian Constitution deals with the disqualification of MPs from the both Houses of Parliament?
 (A) Article 32 (B) Article 102 (C) Article 135 (D) Article 350
- 42.** Who is the author of the famous book titled- The Indian Way- Strategies for an Uncertain World?
 (A) S. Jaishankar (B) Dr. Manmohan Singh
 (C) Ramchandra Guha (D) B. L. Fadia

43. What is true about President of India Honourable Draupadi Murmu?
(A) She is the 16th President of India
(B) She is first women to serve as President of India
(C) She is the third president to be born after Independence
(D) She is the first president to be born after Independence
44. Who has the power to decide an election petition in India?
(A) Election Commission (B) High Court
(C) Parliament (D) Supreme Court
45. Who said, “They who have failed to attain Swaraj within themselves must lose it in the outside world too.”
(A) Aurobindo (B) Gandhi (C) Ambedkar (D) Tagore
46. Which of the following is not included in Article 19 of the Constitution of India?
(A) Right to reside and settle any part of the territory of India
(B) Right of minorities to establish and administer educational institutions
(C) Right to form associations of unions
(D) Right to assemble peaceably and without arms
47. Who among the following is associated with Eco- Feminism?
(A) Arundhati Roy (B) Vandana Shiva (C) Shabana Azmi (D) None of these
48. The major focus of ‘Neighbourhood First’ policy is:
(A) To enhance connectivity, augment trade and investment with South Asian neighbours
(B) To build a secure and stable neighbourhood
(C) Both A and B
(D) None of the above
49. Project Mausam is a policy associated with:
(A) Indian Ocean Region (B) Climate change
(C) Bay of Bengal (D) Nuclear Policy
50. Who was the first woman Chief Election Commissioner of India?
(A) Meira Kumar (B) Rama Devi
(C) Fatima Beevi (D) Sucheta Kripalani

x-x-x

(ROUGH WORK)

Public Administration(Ph.D.)

1. What is the first step in the research process?
(A) Data Collection (B) Hypothesis Testing
(C) Literature Review (D) Problem Identification
2. Which of the following is a qualitative data collection method?
(A) Surveys (B) Experiments (C) Interviews (D) Questionnaires
3. What is the primary purpose of a literature review?
(A) Collect primary data (B) Summarize existing research
(C) Formulate hypotheses (D) Analyze data
4. In hypothesis testing, what is a Type I error?
(A) Accepting a false null hypothesis (B) Rejecting a false null hypothesis
(C) Rejecting a true null hypothesis (D) Accepting a true null hypothesis
5. The Principal of a school conducts an interview session of teachers and students with a view to explore the possibility of their enhanced participation in school activities. This endeavour may be related to which type of research?
(A) Descriptive (B) Exploratory (C) Experimental (D) Action
6. What does reliability in research refer to?
(A) The accuracy of measurement (B) The consistency of measurement
(C) The validity of the results (D) The ethical standards
7. Which of the following is a probability sampling technique?
(A) Snowball Sampling (B) Purposive Sampling
(C) Stratified Sampling (D) Convenience Sampling
8. What is a common method used in mixed methods research?
(A) Only qualitative data
(B) Only Theoretical Analysis
(C) Both qualitative and quantitative data
(D) Both Theoretical analysis and Qualitative data
9. Which of the following ensures the ethical conduct of research?
(A) Random sampling (B) Control group
(C) Informed consent (D) Literature review
10. What is the role of a control group in experimental research?
(A) To provide data for analysis (B) To validate the research hypothesis
(C) To serve as a comparison (D) To collect qualitative data
11. Which type of research validity measures what it claims to measure?
(A) Internal Validity (B) External Validity
(C) Construct Validity (D) Face Validity
12. In qualitative research, what is triangulation?
(A) Using multiple research methods (B) Formulating three hypotheses
(C) Using three data collection methods (D) Verifying data from three sources

13. Ethical norms in research do not involve guidelines for:
(A) Thesis format (B) Copyright
(C) Patenting policy (D) Data Sharing policy
14. Which of the following is an example of secondary data?
(A) Interview transcripts (B) Survey responses
(C) Government reports (D) Direct observations
15. Which statistical test is used to compare means between two groups?
(A) Chi-square test (B) T-test
(C) ANOVA (D) Regression analysis
16. What is the main advantage of using a longitudinal research design?
(A) It is inexpensive
(B) It provides a snapshot in time
(C) It allows the study of changes over time
(D) It is easy to conduct
17. What is the Hawthorne effect?
(A) The effect of lighting on productivity
(B) The impact of observation on behaviour
(C) The influence of group dynamics
(D) The role of incentives in performance
18. In which of the following, the reporting format is formally prescribed?
(A) Doctoral Thesis (B) Conferences of researchers
(C) Workshops and Seminars (D) Symposia
19. What is a meta-analysis?
(A) A detailed literature review
(B) A qualitative research method
(C) A statistical analysis of multiple studies
(D) An experimental research method
20. Which method is commonly used to analyze qualitative data?
(A) Regression analysis (B) Content analysis
(C) T-test (D) Factor analysis
21. In research, what is a null hypothesis?
(A) A hypothesis that there is an effect between variables or groups
(B) A hypothesis that there is no effect between variables or groups
(C) A hypothesis that is always true
(D) A hypothesis that is always false
22. What is the purpose of using a control variable in research?
(A) To manipulate the outcome (B) To keep other variables constant
(C) To increase sample size (D) To test a new hypothesis
23. Which of the following best describes action research?
(A) Research aimed at solving an immediate problem
(B) Research that tests a theoretical framework
(C) Research conducted in a laboratory setting

- (D) Research that involves only quantitative data
24. What is the Delphi method?
 (A) A quantitative forecasting method
 (B) A method to achieve consensus among experts
 (C) A sampling technique
 (D) A statistical analysis method
25. When a research problem is related to heterogeneous population, the most suitable sampling method is:
 (A) Cluster Sampling (B) Stratified Sampling
 (C) Convenient Sampling (D) Lottery Method
26. What does the term "New Public Management" refer to?
 (A) Traditional bureaucratic administration
 (B) Market-oriented approach to public administration
 (C) Community-based governance
 (D) Centralized administrative control
27. Which of the following is a principle of bureaucratic organization according to Max Weber?
 (A) Division of labor (B) Flexible roles
 (C) Decentralization (D) Informal structures
28. E-governance primarily aims to:
 (A) Reduce government expenditure
 (B) Improve the efficiency of public services
 (C) Increase the number of government employees
 (D) Privatize public services
29. Which theory focuses on the employee motivation and worker satisfaction?
 (A) Scientific Management (B) Administrative Management
 (C) Human Relations Theory (D) Systems Theory
30. Simon proposed a new concept of administration based on the methodology of
 (A) Decision making (B) Bounded rationality
 (C) Logical positivism (D) Satisfying
31. Who has analysed leadership in terms of circular response?
 (A) C.I. Barnard (B) M.P. Follet (C) Millet (D) Taylor
32. For every 'principle' of administration, there is a counter-principle, thus rendering the whole idea of principles moot. Which of the following brought the above point of view?
 (A) The Science of Public Administration by R. Dahl
 (B) Administrative Behaviour by H. Simon
 (C) Ventures in Public Policy by Y. Dror
 (D) Administrative State by D. Waldo
33. Which one of the following is captured in the Work Breakdown Structure (WBS)?
 (A) The life cycle phases (B) The logical order of tasks

- (C) The scope of the project (D) Project costs
34. 'No tax shall be levied or collected except by an authority of law'. Which article of the Constitution of India provides this?
 (A) Article 209 (B) Article 215 (C) Article 256 (D) Article 265
35. Who suggested the concept of 'Gang Plank'?
 (A) F.W. Taylor (B) Henry Fayol (C) Max Weber (D) Luther Gulick
36. 'Administration has to do with getting things done with the accomplishment of defined objectives.' The above statement was given by:
 (A) F.W. Taylor (B) L.D. White (C) Luther Gulick (D) Dwight Waldo
37. Which of the following statements are not correct in respect of Rajya Sabha?
 1. It has same powers as those of Lok Sabha
 2. It can pass a vote of no-confidence against Council of Ministers
 3. It cannot amend a money bill
 4. It can be dissolved during emergency
- Select the correct answer from the codes given below:
 (A) 2 and 3 (B) 2, 3 and 4 (C) 1, 2 and 4 (D) 1, 2, 3 and 4
38. Which of the following are the barriers to citizen-centric administration in India?
 1. Wooden and inflexible attitude of the civil servants
 2. Ineffective implementation of laws and rules
 3. Awareness of rights and duties of citizens
 4. Lack of job opportunities for the youth
- Select the correct answer from the codes given below:
 (A) 1, 2, 3 and 4 (B) 1, 2 and 3 only (C) 1, 2 and 4 only (D) 1 and 2 only
39. Select the correct full form of ISDR?
 (A) International Sustainable Development Report
 (B) International Strategy for Disaster Reduction
 (C) International Significant Disaster Resources
 (D) Intergovernmental Strategy for Developing Recreation
- Instructions for Questions 40 - 42. Given below are two statements, one labeled as Assertion (A) and other labeled as Reason (R). Select the correct answer from the codes given below:**
40. **Assertion (A):** Frederick Taylor is known as the father of Scientific Management.
Reason (R): Scientific Management focuses on improving labor productivity through systematic measurement and analysis.
 (A) Both A and R are true, and R is the correct explanation of A.
 (B) Both A and R are true, but R is not the correct explanation of A.
 (C) A is true, but R is false.
 (D) A is false, but R is true.
41. **Assertion (A):** Max Weber introduced the concept of "bureaucracy" in public administration.

48. A public administration scholar is researching the impact of digital technologies on citizen engagement in local governance. Which paradigm is most relevant to this study?
 (A) Traditional Public Administration (B) Public Value Management
 (C) Digital Era Governance (D) Postmodern Public Administration
49. A city council is considering the implementation of a participatory budgeting process where citizens directly decide how to allocate a portion of the municipal budget. This approach aligns with which concept in public administration?
 (A) Bureaucratic Management (B) New Public Service
 (C) E-Governance (D) Classical Public Administration
50. Match the thinkers with the major books they have written.

Column A: Thinkers	Column B: Major Books
1. Frederick Taylor	A. The Functions of the Executive
2. Mary Parker Follett	B. Reinventing Government
3. Chester Barnard	C. Dynamic Administration
4. David Osborne and Ted Gaebler	D. Towards a New Public Administration – The Minnowbrook Perspective
5. Frank Marini	E. Principles of Scientific Management

(A) 1-E, 2-B, 3-C, 4-B, 5-D

(B) 1-B, 2-C, 3-A, 4-D, 5-E

(C) 1-E, 2-C, 3-A, 4-B, 5-D

(D) 1-D, 2-A, 3-C, 4-E, 5-B

x-x-x

Police Administration(Ph.D.)

1. Under Data Collection Methods, which one is not a sub-category of observation method?
 - (A) Structured and Unstructured Observation
 - (B) Controlled and Uncontrolled Observation
 - (C) Telephonic and Personal Observation
 - (D) Participant, Non-Participant and Disguised Observation
2. What is a Null Hypothesis?
 - (A) When there is a fundamental difference between the variables
 - (B) When there is no difference between the variables
 - (C) An acceptance leads to providing support for alternative hypothesis
 - (D) It is not based on the principle of falsification of science
3. Which of the following is not based on Primary Data Collection?
 - (A) Census of India
 - (B) National Family Health Survey
 - (C) National Sample Survey
 - (D) Statistical Abstracts of India
4. The Research Design is:
 - (A) Is not based on validity, reliability, and neutrality
 - (B) The final choice between using Qualitative or Quantitative Methods
 - (C) A common method adopted by all researchers to carry out research and does not lead to clarity of research objectives
 - (D) A framework for every stage of the Data Collection and its analysis
5. Research Process is
 - (A) The systematic or structured approach to conduct research
 - (B) Collecting primary and secondary data through different methods
 - (C) An investigation into a topic or idea to discover newer information or repeated search of facts
 - (D) Preparing report on a problem
6. An Applied Research is
 - (A) research carried on several time periods through a longer period
 - (B) research based on data interpretation and analysis
 - (C) finding practical solutions of an immediate problem
 - (D) formulating theories while finding non-practical solutions
7. The term "Data" came from the Latin root term
 - (A) Detem
 - (B) Datam
 - (C) Datum
 - (D) Dataam
8. Ex Post Facto Research means
 - (A) The research is carried out prior to the incident
 - (B) The research is carried out after the incident
 - (C) The research is carried out along with the happening of an incident
 - (D) The research is carried out keeping in mind the possibilities of an incident

9. The process of marking segments of data with symbols, descriptive words, or category names is known as _____.
- (A) Categorising (B) Coding
(C) Colouring and Compartmentalisation (D) Segmenting
10. A graph that uses vertical bars to represent data is called a ____
- (A) Line graph (B) Bar graph (C) Pie graph (D) Pictograph
11. What is the primary purpose of report writing?
- (A) Analysing and Critiquing Information
(B) Information Discussion and dissemination
(C) Creative expression
(D) Opinion sharing
12. A phenomenon changes over time, what kind of research should be undertaken to study it?
- (A) Experimental and Latitudinal Research (B) Longitudinal Research
(C) Ethnographic Research (D) Ex-post Facto Research
13. How does a report writer ensure coherence in the document?
- (A) Including irrelevant information (B) Ignoring logical flow
(C) Using transitional phrases (D) Disregarding a clear structure
14. Which type of research is undertaken to provide answers to questions of who, what, where, when, and how – but not why.
- (A) Correlational (B) Descriptive (C) Explanatory (D) Applied research
15. When conducting a survey, which of the following is the least reliable method of data collection?
- (A) Online survey with a large sample size
(B) Structured interview with a trained interviewer
(C) Unstructured interview with open-ended questions
(D) Mail survey with a clear and concise questionnaire
16. In an experimental design, the independent variable is the:
- (A) Variable being measured.
(B) Variable that is manipulated by the researcher.
(C) Variable that is not controlled.
(D) Demographic characteristic of the participants.
17. Which type of data is typically collected through surveys and questionnaires?
- (A) Quantitative data only
(B) Qualitative data only
(C) Both quantitative and qualitative data
(D) Neither quantitative nor qualitative data
18. In scientific research, a null hypothesis (H_0) states that:
- (A) There is a strong positive relationship
(B) There is a weak negative relationship
(C) There is no significant difference between variables
(D) There is definite cause-and-effect relationship

19. Which of the following is an advantage of using secondary data for research?
- (A) It is often readily available and inexpensive to obtain.
 - (B) It allows for a high level of control over the data collection process.
 - (C) It is always guaranteed to be accurate and reliable.
 - (D) It is the only way to collect quantitative data.
20. The first and most crucial step in the research process is:
- (A) Data Collection and Data Analysis
 - (B) Hypothesis Formulation and Testing of Hypothesis
 - (C) Identification of Research Problem
 - (D) Literature Review and Synopsis Formulation
21. A research design that involves manipulating one variable to observe its effect on another is called:
- (A) Descriptive research and Doctrinal Research
 - (B) Correlational research
 - (C) Experimental research
 - (D) Case study research
22. When you want to understand the experiences or perspectives of a group of people, you would likely use a:
- (A) Survey research
 - (B) Experiment and Non-Experimental Research
 - (C) Content analysis and Research Reporting
 - (D) Observation and Non-Observational Methods
23. What is the main advantage of using a questionnaire for data collection?
- (A) Allows for in-depth exploration of complex topics
 - (B) Provides a high level of detail and nuance in responses
 - (C) Enables researchers to gather data from a large number of people efficiently
 - (D) Allows for building rapport with participants
24. A researcher is studying the use of social media among teenagers. She wants to ensure her sample reflects the diversity of the teenage population. Which sampling method would be most appropriate?
- (A) Convenience sampling
 - (B) Stratified sampling
 - (C) Snowball sampling
 - (D) Systematic sampling
25. A study investigates the effect of a new fertilizer on crop yield. What type of research design is most appropriate?
- (A) Case study
 - (B) Cross-sectional study
 - (C) Experimental design
 - (D) Longitudinal study
26. Who is considered as the father of Criminology?
- (A) Blackstone
 - (B) Sutherland
 - (C) Lombroso
 - (D) Becker
27. The subject of 'Police' in the Indian Constitution is placed in the:
- (A) Union List Entry II subject to Entry II A of List I

- (B) State List Entry II (including Railway and Village Police) subject to provisions of Entry IIA of List I
- (C) Concurrent List Entry II
- (D) State List Entry II subject to provisions of Entry IIA of List I
- 28.** A along with B, C, D and E collects the weapons in order to threaten Z for extraction of his gold ornaments, when they proceeded towards Z's house they were arrested by the police. For what offence are they liable?
- (A) Attempt to robbery (B) Attempt to theft
(C) Preparation of robbery (D) Preparation of dacoity
- 29.** Which of the following is not come under the definition of 'information' under RTI Act 2005?
- (A) Log books
(B) File notings
(C) Data material held in any electronic form
(D) Circulars
- 30.** First Information Report is a _____ piece of evidence?
- (A) Substantive and Corroborative (B) Corroborative and Contradictive
(C) Exhaustive and Contradictive (D) Only Contradictive
- 31.** This authority is empowered to constitute "Claims Tribunal" under the Motor Vehicle Act, 1988?
- (A) Appropriate Government (B) Road Transport Authority
(C) State Governments (D) Centre Government
- 32.** Any Officer on whom any duty has been imposed under NDPS Act, shall be punishable for contravention of duty for a minimum term of rigorous imprisonment of
- (A) One year (B) Seven years (C) Ten years (D) Life imprisonment
- 33.** As per the Dowry Prohibition Act 1961, when any person is prosecuted for taking or abetting the taking of dowry then the burden of proving that he/she has not committed the offence lies with
- (A) Everyone associated with the person who is being prosecuted
(B) The person who is being prosecuted
(C) The local councillor
(D) The marriage registrar
- 34.** Chemical examination of biological fluids (blood, urine) is used in forensic investigations to detect:
- (A) Fingerprints (B) Drugs and poisons
(C) Cause of death (D) All of the above
- 35.** What is the primary function of INTERPOL?
- (A) To maintain international peace and security
(B) To promote economic cooperation between countries
(C) To facilitate communication and cooperation between police forces worldwide
(D) To advocate for human rights

36. The council of Ministers in a Parliamentary type of Government can remain in office till it enjoys the support of the
- Majority of members of the Upper House of Parliament
 - Majority of the members of the Lower House of parliament
 - Majority of members of both the Houses of Parliament
 - President of India
37. The main objective of the Private Security Agencies (Regulation) Act, 2005 is to:
- Increase the number of private security agencies
 - Regulate the functioning of private security agencies
 - Provide employment opportunities for security guards
 - Empower private security agencies to handle all security threats
38. Differential Association theory of Crime was developed by
- George Ritzer
 - Howard Becker
 - Lombroso
 - Edwin Sutherland
39. In which case the Supreme Court adjudicated that no individual can be forcefully administered a polygraph test, narco-analysis test or BEAP test
- Selvi v State of Karnataka
 - MP Sharma v Satish Chandra
 - Indira Nehru Gandhi v. Shri Raj Narain & Anr
 - None of the above
40. In which year the International Convention for the Suppression of Acts of Nuclear Terrorism was adopted
- 2005
 - 2006
 - 2007
 - 2008
41. Which International Convention deals with diplomatic Relations
- Ramser Convention, 1971
 - Vienna Convention, 1961
 - Bone Convention, 1983
 - Basel Convention, 1989
42. Who among the following modernized the old system of thanas (circles) in a district under a daroga (an Indian) and the Superintendent of the Police at the Head of the District?
- Warren Hastings
 - Lord Cornwallis
 - Lord Minto
 - Lord Mayo
43. The Department of Criminal Intelligence (evolved as domestic and foreign investigative agency) was attached to the Union Government at the Centre by?
- Warren Hastings
 - William Bentick
 - Sir Andrew Fraser
 - Lord Curzon
44. Who defined crime as an Intentional Act in violation of criminal law committed without any defence or excuse and penalized by the State?
- Lombroso
 - Paul Tappan
 - Edwin Sutherland
 - Howard Becker
45. Malimath Committee was constituted for:
- Police Reforms in India
 - Criminal Justice system
 - Public Administration
 - Constitution Review
46. The Bureau of Police Research and Development (BPR&D) was set up on:
- 28 August 1970
 - 18 August 1970
 - 8 August 1971
 - 1 August 1971

47. The essential thing to understand the structure of the organisation is _____.
(A) Delegation (B) Process (C) Control (D) Modification
48. Which of these theories is the most ancient theory of justice?
(A) Deterrent theory (B) Reformative theory
(C) Retributive theory (D) Preventive Theory
49. Idashisha Nongrang is a female DGP of
(A) Assam (B) Meghalaya (C) Tripura (D) Goa
50. The word POLICE originated from the word POLITEIA, which means?
(A) Civil Administration
(B) Internal organization or regulation of the State
(C) An agency charged to enforce Law
(D) A person who enforces the law

Sikh Studies(Ph.D.)

1. The author of the book Behavior Research: A Conceptual Approach is;
(A) Fredrick Kerlinger (B) C R Kothari
(C) Wilkinson (D) Goode and Hatt
2. The conceptual framework in which the research is carried out is called;
(A) Research design (B) Hypothesis
(C) Synopsis of research (D) Research paradigm
3. How does sampling method proves helpful in research;
(A) Reasonably accurate (B) An easy method of getting data
(C) Free from personal biases (D) Its availability in library
4. In order to pursue the research, which of the following is primarily required?
(A) Developing a research design
(B) Formulating research questions
(C) Deciding about the data analysis procedure
(D) Formulating a research hypothesis
5. The term "Research Methodology" helps for;
(A) Goal-oriented research (B) Pursuing systematic research
(C) Attaining an aim of project (D) Getting degree soon
6. Which of the following is a least appropriate method of research for Religious Studies;
(A) Sociological (B) Historical (C) Interpretational (D) Observational
7. What are the core elements of a dissertation?
(A) Introduction; Data Collection; Data Analysis; Conclusions and Recommendations
(B) Executive Summary; Literature Review; Data Gathered; Conclusions; Bibliography
(C) Research Plan; Research Data; Analysis; References
(D) Introduction; Literature Review; Research Methodology; Results; Discussions and Conclusions
8. The main aim of the Social Sciences research project is ;
(A) Improving and updating data interpretation
(B) Confirm pre-suppositions
(C) Introducing new variables of argument
(D) New explanation
9. What is the main aim of interdisciplinary research?
(A) To over simplify the problem of research
(B) To bring out the holistic approach to research
(C) To create a new trend in research methodology
(D) To reduce the emphasis on a single subject in the research domain
10. Which of the following correspond to characteristics of research?
(A) Research is a passive activity

- (B) Research is problem-oriented
 (C) Research de-systemize the available thesis
 (D) Research is a process of imposing the argument
11. The aim of "Religious Studies" is;
 (A) Popularizing the religion (B) Following the teachings of a religion
 (C) Understanding the religion (D) Making Systematic Study of the Religion
12. The Construction of Religious Boundaries is authored by;
 (A) J. S. Grewal (B) Gurinder Singh Maan
 (C) Arvind S Mandher (D) Harjot Oberai
13. Major Challenge for the research about Indian religions is;
 (A) Western method of research (B) Old languages
 (C) Lack of religious aptitude (D) Lack of research training
14. How religious institutions can proves helpful for research in religious studies:
 (A) Funding Projects
 (B) Providing required data and manuscripts
 (C) Setting up research centers
 (D) All of the above
15. In order to pursue the research in Sikh Studies which of the following is priory required?
 (A) To be a Sikh (B) Well versed in Punjabi language
 (C) Having religious attitude (D) Having systematic attitude for research
16. How many major types of research methodology are;
 (A) 6 (B) 4 (C) 3 (D) 5
17. Qualitative and quantitative are;
 (A) Research Methodologies (B) Research Methods
 (C) Levels of research (D) Modes of data collection
18. Which factor among the following falls under the category of research development?
 (A) Descriptive Research (B) Philosophical Research
 (C) Action Research (D) All of these
19. In research term bibliography stands for;
 (A) A list of Books read day to day life
 (B) A list of Books available in library
 (C) A list of Books to be collected to study
 (D) A list of Books and other source material used in research
20. The editors of 'The Routledge Handbook of Research Methods in the Study of Religion' are;
 (A) Michael Stausberg and Steven Angler
 (B) Jacques Derrida and Gianni Vatimo
 (C) Arvind Pal Singh Mander and Anne Murphy
 (D) Syed Waqas and Linda Woodhead

21. Dr. Ganda Singh pursued his research in field of;
 (A) Anthropology (B) History (C) Religious Studies (D) Philosophy
22. Which of the following scholars has contributed to the research of Sufi tradition;
 (A) Sant Singh Sekhon (B) Prof. Harbans Singh
 (C) Lajwanti Rama Krishna (D) Dr. Balkar Singh
23. 'Travels of Guru Nanak' is written by;
 (A) Christopher Shackle (B) Harpal Singh Pannu
 (C) Surinder Singh Kohli (D) Sarbjinder Singh
24. Dr. Kirpal Singh carried out his research on;
 (A) Dasam Granth (B) Adi-Granth
 (C) Janam Sakhis (D) Gurmat Sangeet
25. Which area among the following helps more in the research of Gurmat Darshan?
 (A) Knowledge of Indian languages (B) Knowledge of Indian philosophy
 (C) Knowledge of Indian history (D) Knowledge of Indian society
26. Sri Guru Granth begins with the Raag.
 (A) Malhar (B) Sri Raag (C) Bilawal (D) Gaudi
27. Author of the book Violence and the Sikhs is;
 (A) Arvindpal S Mander (B) Indu Banga
 (C) J. S. Grewal (D) Prof. Harbans Singh
28. The Bani focused on the description of metaphysical experiences with monthly changes is;
 (A) Anand Sahib (B) Bavan Akhri (C) Bara-maha (D) Sukhmani
29. Rag Jayjaywanti is used by;
 (A) Guru Teg Bahadur (B) Guru Nanak Dev Ji
 (C) Bhagat Kabir (D) Guru Arjan Dev
30. Bhai Nand Lal used the poetic genre of ;
 (A) Lyric (B) Gazal (C) Kafi (D) Vaar
31. The number of the contributor of the Bani of Sri Guru Granth Sahib are ;
 (A) 36 (B) 31 (C) 25 (D) 30
32. Udasi Sampardae is ;
 (A) School of Interpretation (B) Independent religion
 (C) A sect of Sikhs (D) A branch of Sikh panth
33. Nasdiya Sukat is a part of;
 (A) Righveda (B) Samveda (C) Yajurveda (D) Aathharveda
34. Panth Prakash is authored by;
 (A) Giani Gian Singh (B) Kaor Singh
 (C) Bhai Gurdas (D) Bhai Vir Singh
35. The 550 birth anniversary of Guru Nanak Devji was celebrated in;
 (A) 2004 (B) 1999 (C) 2021 (D) 2019

36. *The Sacred and Profane* is written by;
 (A) Eliade Mircea (B) E B Tylor (C) James Frazer (D) Sigmund Freud
37. Who is the author of Structural Anthropology:
 (A) Claude Levi-Strauss (B) Martin Buber
 (C) E B Tylor (D) Jean Paul Sartre
38. Who has associated the concept of magic with religion ;
 (A) Karl Jaspers (B) James Frazer (C) Sigmund Freud (D) Max Weber
39. Religious morality and growth of capitalism is proposed by
 (A) Sigmund Freud (B) Karl Jaspers
 (C) Bronislaw Malinowski (D) Martin Buber
40. The post-modernist theory of religion promotes;
 (A) The fall of religion (B) The revival of religion
 (C) Religious domination (D) Meta-narrative of religion
41. Which is not part of the five pillars of Islam;
 (A) Namaz and Zaqat (B) Jihad and Roza
 (C) Masjid and jamaat (D) Haj and Jihad
42. Shia and Suni are sects of;
 (A) Judaism (B) Islam (C) Christianity (D) Zoroastrianism
43. Noble truths in Buddhism are;
 (A) Four (B) Ten (C) Five (D) Three
44. Ang-Agamsin Jainism are;
 (A) Ten (B) Six (C) Twelve (D) Five
45. Jai Dev and Mira Bai belongs to;
 (A) Jainism (B) Bhakti tradition
 (C) Vaisnav (D) Buddhism
46. Digambaras and Śvētāmbaras are the traditions of ;
 (A) Sikhism (B) Buddhism (C) Islam (D) Shaivism
47. Tanakh and Torah are;
 (A) Religious penalties (B) Scriptures
 (C) Religious sects (D) School of interpretation
48. The Protestant is a sect of:
 (A) Hinduism (B) Christianity (C) Islam (D) Zoroastrianism
49. Hymns of Ravi Dass ji in Sri Guru Granth Sahib are;
 (A) 675 (B) 541 (C) 134 (D) 41
50. The no. of *Katebs* are:
 (A) 05 (B) 06 (C) 04 (D) 03

x-x-x

Anthropology(Ph.D.)

1. Which one of the followings represents the correct order of Steven's four levels of measurement?
(A) Ratio, interval, nominal and ordinal (B) Interval, nominal, ordinal and ratio
(C) Ordinal, nominal, ratio and interval (D) Nominal, ordinal, interval and ratio
2. Which of the followings are the essential characteristics of the case study method?
1. Inductive 2. Appreciation oriented 3. Descriptive
4. Deductive 5. Particularistic
(A) 1,3,5 (B) 1,2,3 (C) 3,4,5 (D) 2,4,5
3. Formulation of hypothesis may not be needed in:
(A) Experimental studies (B) Normative studies
(C) Survey method (D) Historical studies
4. Which of the followings are 'non-probability sampling procedures'?
1. Quota sampling 2. Dimensional sampling 3. Cluster sampling
4. Stratified sampling 5. Snowball sampling 6. Simple random sampling
(A) 2,3,6 (B) 4,5,6 (C) 1,2,5 (D) 1,4,6
5. _____ research is aimed at immediate application
(A) Empirical (B) Action (C) Fundamental (D) Conceptual
6. Manipulation is always an essential part of:
(A) Fundamental research (B) Experimental research
(C) Descriptive research (D) Historical research
7. Which one of the following is not a non-parametric test:
(A) Chi-square test (B) Mann- Whitney U Test
(C) t-test (D) Wilcoxon Rank Sum Test
8. With which of the following techniques communality is associated:
(A) Factor analysis (B) Multivariate analysis
(C) SWOT analysis (D) Case studies
9. The variable which influences the relationship between a dependent and an independent variable is called:
(A) Predictor variable (B) Precedent variable
(C) Antecedent variable (D) Control variable
10. Change in response attitude of the respondents during data collection is known as:
(A) Regression Effect (B) Conditioning Effect
(C) Maturation Effect (D) Reactive Effect
11. The classification of exploratory, descriptive, analytical or predictive research studies is based on:
(A) Process of the research (B) Purpose of the research
(C) Logic of the research (D) Outcome of the research

12. The lottery method in sampling is used for:
 (A) Randomization (B) Conceptualization
 (C) Interpretation (D) Theorization
13. _____ is more prone to the issue of violation of ethics in research
 (A) Choice of sampling techniques
 (B) Faulty research design
 (C) Reporting of research findings
 (D) Inaccurate application of statistical techniques
14. Which one of the followings is the best mode for dissemination of ideas, findings and issues/challenges
 (A) Manuscript/Research article (B) Conference/Seminar
 (C) Symposium (D) Workshop
15. Match an item of List-P with that of List-Q and use the codes given below to answer:
- | <u>List-P</u> | <u>List-Q</u> |
|--|---|
| (Type of research) | (Characteristics) |
| (i) Evaluative Research | (a) Exploring possible theorisation for use in situations |
| (ii) Applied Research | (b) Perceiving impact through interventions |
| (iii) Action Research | (c) Improvement in situation through interventions |
| (iv) Fundamental Research | (d) Theory development & effective explanation |
| (A) (i)-(c), (ii)-(a), (iii)-(d), (iv)-(b) | (B) (i)-(c), (ii)-(a), (iii)-(b), (iv)-(d) |
| (C) (i)-(d), (ii)-(a), (iii)-(b), (iv)-(c) | (D) (i)-(d), (ii)-(c), (iii)-(b), (iv)-(a) |
16. _____ is an academic meeting targeted to a well-educated but not specialized audience?
 (A) Conference (B) Symposium (C) Webinar (D) Colloquium
17. Match an item of List-P with that of List-Q and use the codes given below to answer:
- | <u>List-P</u> | <u>List-Q</u> |
|--|--|
| (Term) | (Explanation) |
| (i) Inductivism | (a) Only one method is common to all sciences, irrespective of subject matter |
| (ii) Scientism | (b) Science is qualitatively distinct from all other human areas |
| (iii) Methodologism | (c) One method is common to all sciences; natural or human |
| (iv) Methodological monism | (d) The distinction, superiority and idealhood of science is a kin to its cache of methods |
| (A) (i)-(c), (ii)-(b), (iii)-(d), (iv)-(a) | (B) (i)-(c), (ii)-(a), (iii)-(b), (iv)-(d) |
| (C) (i)-(d), (ii)-(a), (iii)-(b), (iv)-(c) | (D) (i)-(d), (ii)-(c), (iii)-(b), (iv)-(a) |
18. The time frame during which a research study explores a situation or problem is called as
 (A) Retrospective time (B) Longitudinal
 (C) Reference period (D) Age

19. A thesis statement is
 (A) A fact (B) An assertion (C) An observation (D) A discussion
20. The frequency distribution of a research data which is symmetrical in shape similar to a normal distribution but center peak is much higher, is
 (A) Leptokurtic (B) Platykurtic (C) Mesokurtic (D) Skewed
21. Which one of the followings is an example of quantitative variable:
 (A) Postal pin code (B) Highest educational qualification
 (C) Date of birth (D) Time taken to travel to a destination
22. Which one of the followings is NOT an essential characteristic of research:
 (A) Subjectivity (B) Generalizability (C) Reliability (D) Replicability
23. Which one of the followings is NOT an attitudinal scale used in qualitative research:
 (A) Likert scale (B) Thurstone scale (C) Guttman scale (D) Ordinal scale
24. A research hypothesis is best described as:
 (A) A proven fact (B) A sample of the population
 (C) A tentative prediction or explanation (D) A qualitative research tool
25. An empiricist believes that:
 (A) No knowledge is genuine
 (B) Social science methods cannot be applied in natural sciences
 (C) Knowledge is acquired through sensory perceptions
 (D) Natural science methods should not be applied to social science research
26. 'Dental comb' and 'grooming claw' are the primate characteristic feature of:
 (A) Lemurs only (B) Tarsiers only
 (C) Both Lemurs and Lorises (D) Lorises only
27. Match an item of List-P with that of List-Q and use the codes given below:
- | <u>List-P</u> | <u>List-Q</u> |
|--|--|
| (i) Nirmal Kumar Bose | (a) Race, Language and Culture |
| (ii) Franz Boas | (b) Structure of Hindu Society |
| (iii) Brian Fagan | (c) Races and Cultures of India |
| (iv) D.N. Majumdar | (d) People of Earth |
| (A) (i)-(c), (ii)-(d), (iii)-(b), (iv)-(a) | (B) (i)-(c), (ii)-(a), (iii)-(b), (iv)-(d) |
| (C) (i)-(b), (ii)-(a), (iii)-(d), (iv)-(c) | (D) (i)-(d), (ii)-(c), (iii)-(b), (iv)-(a) |
28. Match the followings:
- | <u>Neanderthal skull</u> | <u>Discovered from</u> |
|--|--|
| (i) Rhodesian Man | (a) Murr (Germany) |
| (ii) Steinheim | (b) Correze (France) |
| (iii) Ehringsdorf | (c) Weimer (Germany) |
| (iv) La Chapelle-aux Saints | (d) Broken Hill Mine (South Africa) |
| (A) (i)-(c), (ii)-(d), (iii)-(a), (iv)-(b) | (B) (i)-(d), (ii)-(a), (iii)-(c), (iv)-(b) |
| (C) (i)-(d), (ii)-(b), (iii)-(c), (iv)-(a) | (D) (i)-(a), (ii)-(b), (iii)-(c), (iv)-(d) |

29. _____ is a special type of kinship behavior wherein father-to-be/husband is to undergo or imitate an austere life symbolic of pregnancy and childbirth.

- (A) Amitate (B) Avunculate (C) Couvade (D) Teknonymy

30. 'Turtle torture' is an indication of multiple violent injuries in the:

- (A) Vertebrae (B) Ribs (C) Skull (D) Phalanges

31. Match the followings:

Name of Book

- (i) Ancient Society
(ii) Chrysanthemum and Sword
(iii) Castes and other inequalities
(iv) Social Anthropology

Author

- (a) Andre Beatille
(b) Edmund Leach
(c) L.H. Morgan
(d) Ruth Benedict

(A) (i)-(b), (ii)-(c), (iii)-(d), (iv)-(a)

(B) (i)-(a), (ii)-(b), (iii)-(c), (iv)-(d)

(C) (i)-(c), (ii)-(d), (iii)-(a), (iv)-(b)

(D) (i)-(d), (ii)-(b), (iii)-(c), (iv)-(a)

32. Match an item of List-P with that of List-Q and use the codes given below to answer:

List-P

- (i) W.H.R. Rivers
(ii) G.P. Murdock
(iii) B. Malinowski
(iv) A.L. Apstein

List-Q

- (a) Cross-cultural Comparison
(b) Extended-case Method
(c) Genealogical Method
(d) Participation Observation

(A) (i)-(c), (ii)-(a), (iii)-(d), (iv)-(b)

(B) (i)-(c), (ii)-(d), (iii)-(a), (iv)-(b)

(C) (i)-(b), (ii)-(a), (iii)-(d), (iv)-(c)

(D) (i)-(d), (ii)-(c), (iii)-(b), (iv)-(a)

33. Name the bone which starts its ossification during intra-uterine life and is the last bone to complete its maturational growth in adult life:

- (A) Collarbone (Clavicle) (B) Shin bone (Tibia)
(C) Innominate bone (Pelvis) (D) Breastbone (Sternum)

34. Match an item of List-P with that of List-Q and use the codes given below to answer:

List-P

- (i) Genetic Distance
(ii) Twin Method
(iii) Dosage Compensation
(iv) One Gene-One Enzyme Hypothesis

List-Q

- (a) Beadle and Tautam
(b) JBS Haldane
(c) Mary Lyon
(d) Francis Galton

(A) (i)-(c), (ii)-(d), (iii)-(b), (iv)-(a)

(B) (i)-(a), (ii)-(b), (iii)-(c), (iv)-(d)

(C) (i)-(b), (ii)-(d), (iii)-(c), (iv)-(a)

(D) (i)-(d), (ii)-(c), (iii)-(b), (iv)-(a)

35. Dryopithecine cuspid pattern, maxillary molar taurodontism and enamel pearls are the characteristic identifying dental features of:

- (A) Australoids (B) Mongoloids (C) Caucasoids (D) Negroids

36. 'Callitrichidae' and 'Cebidae' are the two important families of:

- (A) Prosimians (B) New World Monkeys
(C) Old World Monkeys (D) Hominoids

37. Which one of the followings is not an example of progressive Neanderthal man?

- (A) Steinheim (B) Krapina

(C) La Chappelle-aux-Saints (D) Ehringsdorf

38. _____ is the commonly used method for forensic age estimation in adult living individuals, which has been tested and verified on the largest number of individuals in different population groups:

- (A) Greulich and Pyele method of wrist and hand
- (B) Willem's method of teeth
- (C) Suchey and Brooks method of pubic symphysis
- (D) McKern and Stewart method of epiphyseal union

39. The correct order of prehistoric European cultural traditions is:

- (A) Azilian→Maglemosian→Perigordian→Gravettian
- (B) Gravettian→Perigordian→Azilian→Maglemosian
- (C) Maglemosian→Azilian→Perigordian→Gravettian
- (D) Perigordian→Gravettian→Azilian→Maglemosian

40. Match an item of List-P with that of List-Q and use the codes given below:

List-P

- (i) V.G. Childe
 - (ii) Claude Levi-Strauss
 - (iii) Karl Marx
 - (iv) A.R. Radcliffe-Brown
- (A) (i)-(c), (ii)-(a), (iii)-(b), (iv)-(d)
(C) (i)-(b), (ii)-(a), (iii)-(d), (iv)-(c)

List-Q

- (a) Structuralism
 - (b) Historical Materialism
 - (c) Neo-Evolutionism
 - (d) Structural Functionalism
- (B) (i)-(c), (ii)-(d), (iii)-(a), (iv)-(b)
(D) (i)-(d), (ii)-(c), (iii)-(b), (iv)-(a)

41. _____ is a descent rule of residence when the couple is expected to live with husband's father's sister's family is:

- (A) Neolocal
- (B) Bilocal
- (C) Amitolocal
- (D) Avunculocal

42. Match the following:-

Bone

- (i) Vomer
 - (ii) Incus
 - (iii) Calcaneus
 - (iv) Gladiolus
- (A) (i)-(c), (ii)-(d), (iii)-(a), (iv)-(b)
(C) (i)-(d), (ii)-(a), (iii)-(c), (iv)-(b)

Classification category

- (a) Thoracic skeleton
 - (b) Podiatric skeleton
 - (c) Cranial skeleton
 - (d) Facial Skeleton
- (B) (i)-(d), (ii)-(c), (iii)-(b), (iv)-(a)
(D) (i)-(a), (ii)-(b), (iii)-(c), (iv)-(d)

43. 'Torus' and 'green-stick' fractures of human skeleton are the identifying features of osseous traumatic lesions in:

- (A) Elderly people
- (B) Adults
- (C) Children
- (D) Neonates

44. The human dentition is a type of:

- (A) Bilophodont and Heterodont
- (B) Unilophodont and Heterodont
- (C) Bilophodont and homodont
- (D) Unilophodont and homodont

45. Prophase of Mitosis-I is correctly represented by the following sequence:

- (A) Diplotene-Leptotene-Diakinesis-Zygotene-Pachytene

- (B) Leptotene-Zygotene-Pachytene-Diplotene-Diakinesis
- (C) Leptotene-Pachytene-Zygotene-Diplotene-Diakinesis
- (D) Leptotene-Zygotene-Pachytene-Diakinesis-Diplotene

46. Identify the correct sequence of glaciations periods:

- (A) Wurm-Riss-Mindel-Gunz
- (B) Mindel-Wurm-Riss-Gunz
- (C) Gunz-Mindel-Riss-Wurm
- (D) Wurm-Mindel-Riss-Gunz

47. Who authored the book 'Homo hierarchicus':

- (A) Louis Dumont
- (B) Eric Wolf
- (C) David Mandelbaum
- (D) Andre Beattille

48. The correct descending order of kin groups is:

- (A) Clan→Moiety→Phratry→Lineage
- (B) Phratry→Moiety→Lineage→Clan
- (C) Clan→Lineage→Phratry→Moiety
- (D) Moiety→Phratry→Clan→Lineage

49. The measure for coefficient of inbreeding was proposed by:

- (A) Kary Mullis
- (B) Sewall Wright
- (C) Harry Harris
- (D) Archibald Garrod

50. Match an item of List-P with that of List-Q and use the codes given below to answer:

List-P

- (i) Structural Functionalism
- (ii) Evolutionism
- (iii) Structuralism
- (iv) Functionalism

List-Q

- (a) LH Morgan
- (b) Radcliffe Brown
- (c) B. Malinowski
- (d) Claude Levi-Strauss

(A) (i)-(b), (ii)-(a), (iii)-(d), (iv)-(c)

(B) (i)-(c), (ii)-(a), (iii)-(d), (iv)-(b)

(C) (i)-(b), (ii)-(c), (iii)-(d), (iv)-(a)

(D) (i)-(a), (ii)-(b), (iii)-(c), (iv)-(d)

x-x-x

(ROUGH WORK)

Botany(Ph.D.)

- The technique of Microinjection is used to
 - Produce sticky ends of DNA
 - Provide protection against pathogen
 - Purify the DNA
 - Inject recombinant DNA into the nucleus of a cell
- Production of individual tissue cells from a primary culture by breaking the cell-cell & cell-matrix interactions, does not require
 - EDTA
 - Trypsin
 - Collagenase
 - Separase
- Separation of protein in 2-D gel electrophoresis is based on
 - Mass and hydrophobicity
 - Mass
 - Charge and mass properties
 - Disulfide bonding
- Which of the following have been approved for commercial cultivation as transgenic crops in India?
 - Cotton
 - Rice
 - Wheat
 - Cotton, Brinjal & Rice
- Which of the following is used to study transcription factors and their binding sites
 - DNase I Footprinting
 - Western blotting
 - Northern blotting
 - Microarray
- Consider a mixture containing three same sized peptides P, Q and R out of which P is positively charged, Q is weakly negative and R is strongly negative. What will be the order of elution when it is passed through an ion-exchange chromatography column containing an anionic resin?
 - P, Q, R
 - R, Q, P
 - Q, R, P
 - P, Q, R elute together
- Which one of the following set of essential components are required for sanger method of DNA sequencing apart from DNA template, primer, $MgCl_2$, TRIS-HCl, DNA polymerase
 - 4 deoxyribonucleotides, 4 labelled dideoxynucleotides
 - 4 labelled dideoxynucleotides, DNA ligase
 - 4 labelled dideoxynucleotides, Telomerase
 - 4 deoxyribonucleotides, 4 labelled dideoxynucleotides, DNA ligase

8. Which is the best method for identification of proteins moving together (as a single band) upon loading in a SDS-PAGE gel
- (A) Southern blot (B) NMR spectroscopy
(C) Western blot (D) ESR spectroscopy
9. The element not required for the maintenance and stability of the circular yeast artificial chromosomes during cell division is
- (A) Origin of replication (B) Enhancer
(C) Centromeres (D) Telomeres
10. Which technique is most suitable to measure the mass of a protein with the highest accuracy?
- (A) Ultracentrifugation (B) Gel-filtration
(C) Analytical SDS-PAGE (D) Mass spectrometry
11. Which statistical test can be used to validate the statement '*People having high cholesterol suffer more from obesity*'?
- (A) Student 't' test (B) Regression analysis
(C) Pearson correlation coefficient (D) ANOVA
12. Which of the following method can be used to identify different strains of virus?
- (A) Electrophoresis (B) Compound microscopy
(C) Sequencing (D) Observing symptoms of disease
13. Who developed the PCR technique?
- (A) Kohler (B) Altman (C) Milstein (D) Kary Mullis
14. Denaturation of DNA double helix occurs at what temperature?
- (A) 54°C (B) 74°C (C) 94°C (D) 60°C
15. Which of the following enzyme is used for labelling of antibodies in direct ELISA?
- (A) Alkaline Phosphatase (B) Hyaluronidase
(C) Lactase (D) Amylase
16. Northern blotting is a technique for the detection of
- (A) Specific DNA in a sample (B) Specific RNA in a sample
(C) Specific protein in a sample (D) Specific glycolipid in a sample
17. Which of the following is the Father of Microscopy?
- (A) Antonie van Leeuwenhoek (B) Robert Brown

- (C) Robert Hooke (D) Perkinje
18. What is the primary function of CRISPR-Cas system in bacteria?
(A) Protein synthesis (B) DNA replication
(C) ATP synthesis (D) Immune defence
19. Which of these is not the main parameters for autoclave
(A) Time (B) Steam (C) Temperature (D) Gravity
20. Normal distribution is not symmetric around which of the following
(A) Mean (B) Median (C) Mode (D) Variance
21. What is the minimum resolution in an electron microscope?
(A) 20 mm (B) 0.2 nm (C) 100 nm (D) 10 nm
22. A vector, in rDNA technology, refers to
(A) an enzyme that cuts DNA (B) Exonuclease
(C) a plasmid (D) DNA ligase
23. What is the full form of BLAST
(A) Basic Local Alignment Search Tool
(B) Bombardment of Linear and Sticky template
(C) Basic Length and Similarity Tool
(D) Basic Logistics and Similarity Tool
24. Which of the following is not a measure of central tendency
(A) Mean (B) Median (C) Range (D) Mode
25. Which of the following is not an essential component of a Laminar air flow chamber
(A) HEPA (B) Air (C) UV light (D) Humidity
26. Which of the following is a motile flagellated asexual cell?
(A) Antherozoid (B) Zoospore (C) Androspore (D) Monospore
27. The algal cell wall is composed of
(A) Cellulose (B) Chitin (C) Suberin (D) Cutin
28. The discovery of Penicillin is attributed to
(A) Alexander Fleming (B) A.F. Blakeslee
(C) Elie Metchinkoff (D) Felix Dujardin

29. The causal organism of Tikka disease is
 (A) *Fusarium* (B) *Cercospora* (C) *Colletotrichum* (D) *Puccinia*
30. The example of mutualism is
 (A) Lichens (B) Hypertrophy (C) Damping off (D) Crown gall
31. The outer layer of virus is made up of
 (A) Fats (B) Proteins (C) Carbohydrates (D) Nucleic acids
32. Leaf curl disease of papaya is caused by
 (A) Fungus (B) Mycoplasma (C) Virus (D) Bacteria
33. Heterospory is the production of
 (A) Diploid and tetraploid spores (B) Sexual and asexual spore
 (C) Megaspores and microspores (D) Haploid and diploid spores
34. In *Pinus*, the bract scale is a part of
 (A) Megasporophyll (B) Microsporophyll (C) Ovule (D) Dwarf shoot
35. In bryophytes, calyptra develops from
 (A) Base of archegonium (B) Wall of venter
 (C) Tissue of archegoniophore (D) None of these
36. What is the full form of AFLP
 (A) Amplified Fragment Length Polymorphism
 (B) Amplification For Linear Polymorphism
 (C) Amplified Fragment Linear Polymorphism
 (D) Amplification For Length Polymorphism
37. During cytokinesis, what determines the site of the division plane of animal cells
 (A) Position of nucleus (B) Central spindle
 (C) Pre-prophase band (D) Randomly
38. Which of the following is involved in Ca^{2+} -dependent cell-cell adhesion
 (A) Calmodulin (B) Cadherin (C) N-CAM (D) Calpain
39. The food conducting tissue in plants is
 (A) Xylem (B) Phloem (C) Parenchyma (D) Sclereids

40. The enzyme RUBISCO is involved in
 (A) Light dependent reaction (B) Z-scheme
 (C) Calvin cycle (D) C4 fixation
41. In higher plants, urease enzyme is associated with which one of the following essential micronutrients
 (A) Nickel (B) Molybdenum (C) Zinc (D) Copper
42. Which is not an xerophytic adaptive modification
 (A) Strongly developed sclerenchyma (B) Sunken stomata
 (C) Presence of lacunar tissues (D) Sparse stomata
43. The major function of auxin is
 (A) Controlling abscission of leaves (B) Promoting stem regulation
 (C) Ripening of fruit (D) Promoting root elongation
44. Which molecules are involved in recognition of rhizobia host interaction during symbiotic biological nitrogen fixation
 (A) Lectins and lipids (B) Lectins and polysaccharides
 (C) Flavonoids and lipids (D) Lectins and alkaloids
45. The peptidyl transferase activity is a characteristic of which of the following RNAs
 (A) tRNA (B) 5S rRNA (C) 16S rRNA (D) 23S rRNA
46. Which of the following conditions is required to switch on *Lac* operon in *E.coli*
 (A) + Glucose, + Lactose (B) + Glucose, - Lactose
 (C) - Glucose, - Lactose (D) - Glucose, + Lactose
47. In a double-stranded DNA sequence, the content of cytosine (C) is 20%. What is the amount of Adenine (A)
 (A) 20% (B) 30% (C) 50% (D) 60%
48. In eukaryotes, precursors of micro RNAs (miRNAs) is usually synthesized by
 (A) RNA Pol I & III (B) RNA Pol III (C) Only RNA Pol I (D) RNA Pol II
49. If the diploid chromosome number of an organism is $2n=14$, the nullisomic chromosomal number would be
 (A) 12 (B) 13 (C) 15 (D) 16
50. The ethidium bromide is used as an
 (A) Deaminating agent (B) Alkylating agent
 (C) Intercalating agent (D) Base analogue

x-x-x

Bio-Chemistry(Ph.D.)

1. One of the terms given below is defined as a bundle of meanings or characteristics associated with certain events, objects, conditions, situations, and the like
(A) Construct (B) Definition (C) Concept (D) Variable
2. In the process of conducting research 'Formulation of Hypothesis' is followed by
(A) Statement of Objectives (B) Analysis of Data
(C) Selection of Research Tools (D) Collection of Data
3. The primary goal of applied research is to?
(A) Solve or provide answers to practical problems
(B) Testing theories and hypotheses
(C) Addressing research issues in partnership with local people
(D) Primary goal is gaining knowledge, with no aim of using it
4. Sciences are broadly divided in to _____?
(A) Natural sciences and human sciences
(B) Natural sciences and social sciences
(C) Natural sciences and physical sciences
(D) Physical sciences and Physiological sciences
5. What are the main purposes of data analysis?
(A) Description (B) Construction of Measurement Scale
(C) Generating empirical relationships (D) Explanation and prediction
6. The method that consists of collection of data through observation and experimentation, formulation and testing of hypothesis is called _____ method.
(A) Empirical (B) Scientific
(C) Scientific information (D) Practical knowledge
7. _____ is making up data or results and recording or reporting them.
(A) Plagiarism (B) Falsification (C) Publication (D) Fabrication
8. Research should be driven only by desire to establish _____.
(A) Information (B) Conclusion (C) Truth (D) Planning
9. A specific plan or protocol for conducting research that allow a researcher to transform conceptual hypothesis into practical one is _____.
(A) Research (B) Basic research (C) Study design (D) Research problem
10. The feasibility of a research study should be considered in light of :
(A) Cost and time required to conduct research
(B) Skill required of researcher
(C) Potential ethical concerns
(D) All of the above
11. Which type of research is undertaken to provide answers to questions- who, what, where, when and how, but not Why?
(A) Correlational (B) Descriptive (C) Applied research (D) Basic research

12. A systematic study directed towards greater knowledge or understanding of the fundamental aspects of phenomenon is called _____
 (A) Applied research (B) Basic research
 (C) Qualitative research (D) Quantitative research
13. All research processes start with _____.
 (A) Hypothesis (B) Analysis (C) Observation (D) Deduction
14. Summarize and Synthesize are characteristics of :
 (A) Research design (B) Literature review
 (C) Journalism (D) All of the above
15. What is the purpose of formulating a research problem in operational terms?
 (A) To narrow down the scope of the problem
 (B) To make the problem more complex
 (C) To make the problem less specific
 (D) To discriminate relevant data from irrelevant ones
16. What is a dependent variable in a research study?
 (A) A variable that is manipulated by the researcher
 (B) A variable that is not affected by other variables
 (C) A variable that is measured or observed in response to the independent variable
 (D) A variable that is controlled by the research participants
17. What is the purpose of data analysis in the research process?
 (A) To collect data from research participants
 (B) To test the research hypothesis
 (C) To review the existing literature
 (D) To design the research study
18. A research problem is feasible only when:
 (A) it has utility and relevance
 (B) it is researchable
 (C) it is new and adds something to knowledge
 (D) all of the above
19. Authenticity of a research finding is its:
 (A) Originality (B) Validity (C) Objectivity (D) All of these
20. Research problem is selected from the stand point of:
 (A) Researcher's interest (B) Financial support
 (C) Scientific relevance (D) Availability of relevant literature
21. Which of the following should be included in a research proposal?
 (A) Your academic status and experience
 (B) The difficulties you encountered with your previous reading on the topic.
 (C) Your choice of research methods and reasons for choosing them.
 (D) All of the above
22. What did Marx (1997) mean when he suggested that "intellectual puzzles and contradictions" can be a possible source of research questions?

- (A) The researcher may feel that there is a contradiction in the literature, presenting a "puzzle" to be solved.
- (B) Students can develop their IQ levels by attempting to solve intellectual puzzles.
- (C) Unless you can find a logical contradiction, you have no basis for conducting research.
- (D) Any puzzle can be researched.
- 23.** If a study is "reliable", this means that:
- (A) the methods are outlined in the methods discussion clearly enough for the research to be replicated.
- (B) the measures devised for concepts are stable on different occasions.
- (C) the findings can be generalized to other social phenomena.
- (D) it was conducted by a reputable researcher who can be trusted.
- 24.** Empirically verifiable observation is
- (A) Theory (B) Value (C) Fact (D) Statement
- 25.** Research is classified on the basis of _____ and methods
- (A) Purpose (B) Intent (C) Methodology (D) Techniques
- 26.** Peptide: ala-glu-ser-lys-gly will bind to an anion exchange resin at pH:
- (A) 13 (B) 7 (C) 5 (D) 1
- 27.** In a metabolic pathway, the enzyme proportionally least limiting the velocity is that which:
- (A) is at the beginning of the pathway
- (B) catalyzes an irreversible reaction
- (C) catalyzes reactions that are near equilibrium
- (D) shows low activity due to a high K_M or low V_{max}
- 28.** Which one of the following is an indispensable condition for the reaction to proceed?
- $$\text{Glucose} + \text{ATP} \rightarrow \text{glucose 6P} + \text{ADP} + \text{P}_i \quad \Delta G^{\circ} = -4,0 \text{ kJ mol}^{-1}$$
- (A) increase the concentration of ATP (B) increase the temperature
- (C) presence of hexokinase (D) hydrolysis of ATP
- 29.** Steroid hormones act at the cellular level:
- (A) inhibiting pre existing enzymes (B) through a second messenger
- (C) by regulating gene expression (D) through G proteins
- 30.** Identify the oxidizing agent in the following reaction (E= enzyme):
- $$\text{NADH} + \text{H}^+ + \text{E-FMN} \leftrightarrow \text{NAD}^+ + \text{E-FMNH}_2$$
- (A) $\text{NADH} + \text{H}^+$ (B) E-FMN (C) NAD^+ (D) E-FMNH₂
- 31.** When the standard free energy change of a chemical reaction is > 0 :
- (A) its $K_{eq} > 1$ (B) it is endergonic
- (C) it proceeds at very low speed (D) it continues until running out of substrates
- 32.** Muscular glycolysis accelerates following the increase in intracellular concentration of:
- (A) $\text{NADH} + \text{H}^+$ (B) glucose (C) AMP (D) oxygen

33. Insulin promotes the synthesis of fatty acids in the liver because it promotes dephosphorylation of the enzyme:
 (A) carnitine palmitoyltransferase I (B) acetyl CoA carboxylase
 (C) fatty acid synthase (D) malic enzyme
34. What is the advantage of phosphorylation of glucose in liver from a biochemical point of view:
 (A) contributes to regulation of glycemia (B) impairs outflow of glucose from the cell
 (C) allows its storage as glycogen (D) all of the above
35. Vitamin K is involved in posttranslational modification of the blood clotting factors by acting as cofactor for the enzyme:
 (A) Carboxylase (B) Decarboxylase (C) Hydroxylase (D) Oxidase
36. Fatty acids cannot be converted into carbohydrates in the body as the following reaction is not possible.
 (A) Conversion of glucose-6-phosphate into glucose
 (B) Fructose 1,6-bisphosphate to fructose-6-phosphate
 (C) Transformation of acetyl CoA to pyruvate
 (D) Formation of acetyl CoA from fatty acids
37. Glycosphingolipids are a combination of
 (A) Ceramide with one or more sugar residues
 (B) Glycerol with galactose
 (C) Sphingosine with galactose
 (D) Sphingosine with phosphoric acid
38. Given below is an incomplete table about certain hormones, their source glands and one major effect of each on the body in humans. Identify the correct option for the three blanks A, B and C

GLANDS	SECRETION	EFFECT ON BODY
X	Estrogen	Maintenance of secondary sexual characters
Alpha cells of Islets of Langerhans	Y	Raises blood sugar level
Anterior pituitary	Z	Over secretion leads to gigantism

- | | X | Y | Z |
|-----|----------|----------|----------------|
| (A) | Placenta | Glucagon | Calcitonin |
| (B) | Ovary | Glucagon | Growth hormone |
| (C) | Placenta | Insulin | Vasopressin |
| (D) | Ovary | Insulin | Calcitonin |
39. Which of the following is true of flavin nucleotides?
 (A) They have no reduction potential unless bound to a protein.
 (B) They always accept two electrons.
 (C) They are utilized by oxygenases.
 (D) They act as prosthetic groups.

40. Regarding apoptosis, select the one FALSE statement:

- (A) Apoptosis can be initiated by the interaction of certain ligands with specific receptors on cell surface.
- (B) Cell stress and other factors activate the mitochondrial pathway of apoptosis; release of cytochrome P450 into the cytoplasm is an important event in this pathway.
- (C) A distinct pattern of fragments of DNA is found in apoptotic cells; it is caused by caspase-activated DNase.
- (D) Cancer cells have acquired various mutations that allow them to evade apoptosis, prolonging their existence.

41. The bond that stabilize the structure of DNA are:

- (A) Hydrogen bonds and peptide bonds
- (B) Phosphodiester bonds and hydrogen bonds
- (C) Hydrogen bonds and thioester bonds
- (D) Disulphide bonds and hydrogen bonds

42. RFLP analysis is a technique that:

- (A) Uses hybridization to detect specific DNA restriction fragments in genomic DNA
- (B) Is used to determine whether a gene is transcribed in specific cells
- (C) Measures the transfer frequency of genes during conjugation
- (D) Is used to detect genetic variation at the protein level

43. A cDNA library differs from a genomic library:

- (A) In excluding DNA that codes for mitochondrial proteins
- (B) In excluding DNA that codes ribosomal proteins
- (C) Only by having longer polynucleotide fragments
- (D) Only by having exons excised from gene

44. Signal sequence for targeting different polypeptide to final destination has?

- (A) A carboxy terminal region
- (B) Amino terminal with positive charge
- (C) Hydrophilic residues
- (D) Hydrophilic core

45. Which of two hormones act on the hypothalamus to increase satiety and hunger, respectively?

- (A) Leptin and insulin
- (B) Leptin and Ghrelin
- (C) Ghrelin and Leptin
- (D) Insulin and Leptin

46. Which fatty acids found in plasma phospholipids are associated with reduced cardiovascular mortality?

- (A) Palmitic acid
- (B) Stearic acid
- (C) Docosahexaenoic acid
- (D) Alpha-linolenic acid

47. Which of the following techniques would be most useful to identify and quantify the presence of a known impurity in a drug substance?

- (A) NMR
- (B) MS
- (C) IR
- (D) HPLC

48. A child is noted to have recurrent respiratory infections that necessitate hospitalization. His lab tests demonstrate a decrease in T cells, B cells, natural killer cells and decreased antibodies. He is found to have severe combined immune deficiency. The enzyme that is defective in this disorder is important in which of the following processes?
- (A) Conversion of ribonucleotides to deoxy ribonucleotides
 - (B) Formation of AMP
 - (C) Conversion of dUMP to dTMP
 - (D) Conversion of adenosine to inosine
49. In an SDS-PAGE experiment proteins are separated on the basis of their:
- (A) Charge-to-mass ratio
 - (B) Molecular weight
 - (C) Different isoelectric points
 - (D) Positively charged side chains
50. Assume that the reaction catalyzed by an enzyme follows Michaelis-Menten kinetics. If at a substrate concentration of 100 nM, the reaction proceeds at 98% of the maximum reaction velocity (V_{max}), what is the Michaelis constant (K_m) for this substrate. K_m is the substrate concentration needed to reach 50% of V_{max} .
- (A) 2 nM
 - (B) 5 nM
 - (C) 10 nM
 - (D) 50 nM

x-x-x

(ROUGH WORK)

Bio-Physics(Ph.D.)

1. Action research is very important. Which of the following defines it aptly?
(A) A longitudinal research
(B) An applied research
(C) A research initiated to solve an immediate problem
(D) A research with socioeconomic objective
2. Research reporting is outcome of research. Which of the following is imperative about the method of research reporting?
(A) Globalized
(B) Ethical and attractive
(C) Personal
(D) Scientific
3. How the difficulty which a researcher experiences in the context of either a theoretical or practical situation and in stride to obtain a solution for the same can be defined as
(A) An Illustration
(B) Pre-established assumptions
(C) The hypothesis
(D) The research problem
4. What is the disadvantage of patent protection?
(A) Details of the invention are open for public
(B) Application process is simple and quick
(C) Costs associated with the patent
(D) Patents are beneficial for humanity
5. When do we observe the Chi-square distribution?
(A) When we deal with collections of values that involve adding up squares.
(B) When population standard deviation (σ_p) is not known
(C) When sampling is from a normal population
(D) When parameter value is not known and we have to estimate it from the sample
6. Which of the following is the first step in research process
(A) Selection of a topic
(B) Formulating research problem
(C) Development of a hypothesis
(D) Preparation of bibliography
7. Which of the following is not a type of research?
(A) One-time research
(B) Recessive research
(C) Stimulation research
(D) Longitudinal research
8. A null hypothesis is:
(A) Where there is no difference between the variables
(B) The same as research hypothesis
(C) Subjective in nature
(D) When there is a difference between the variables
9. Plagiarism where the writer changes a few words in the original text of another is known as:
(A) Direct copying (B) Word switch (C) Paraphrasing (D) Is Not plagiarism

10. If a person uses someone's song as background musics in his/her music video then it is an example of
 (A) Copyright infringement (B) Cyber bullying
 (C) Hacking (D) Identity theft
11. The use of information and ideas protected under IPR are of
 (A) Cultural value (B) Commercial value (C) Aesthetic value (D) Social Value
12. The symbol of Maharaja used by Air India is
 (A) Copyright (B) Patent
 (C) Trademark (D) Can be used by anyone
13. Ethical neutrality is a feature of
 (A) Deduction (B) Scientific method (C) Experience (D) Observation
14. Population census is an example of _____ Research
 (A) Survey (B) Empirical (C) Clinical (D) Diagnostic
15. _____ is a way to systematically solve the research problem
 (A) Technique (B) Operations
 (C) Research Methodology (D) Research Process
16. A hypothesis is a
 (A) Tentative statement whose validity is still to be tested
 (B) Supposition which is based on the past experiences
 (C) Statement of fact
 (D) Just a sentence
17. Type-1 Error occurs when
 (A) The null hypothesis is rejected even when it is true
 (B) The null hypothesis is accepted even when it is false
 (C) The null hypothesis as well as Alternative hypothesis, both are rejected
 (D) None of the above
18. The Data of research is, generally
 (A) Qualitative only (B) Quantitative only
 (C) Both (A) and (B) (D) Neither (A) nor (B)
19. In research data is collected with reasonable standard of _____.
 (A) Beauty (B) Feasibility (C) Accuracy (D) Doubt
20. To test null hypothesis, a researcher uses:
 (A) t test (B) ANOVA (C) χ^2 (D) Factorial analysis
21. Bibliography given in a research report:
 (A) Shows vast knowledge of the researcher
 (B) Helps those interested in further research
 (C) Has no relevance to research
 (D) Should not be given
22. Authenticity of a research finding is its:
 (A) Originality (B) Validity (C) Objectivity (D) Plagiarism

23. We use Factorial Analysis:
- (A) To know the relationship between two variables
 - (B) To test the Hypothesis
 - (C) To know the difference between two variables
 - (D) To know the difference among the many variables
24. Formulation of hypothesis may NOT be required in:
- (A) Survey method
 - (B) Historical studies
 - (C) Experimental studies
 - (D) Normative studies
25. Field-work-based research is classified as:
- (A) Empirical
 - (B) Historical
 - (C) Experimental
 - (D) Biographical
26. Which of the following statement best describes cell cycle
- (A) $G1 \rightarrow G2 \rightarrow M \rightarrow \text{Cytokinesis}$
 - (B) $M \rightarrow G1 \rightarrow G2 \rightarrow \text{Cytokinesis}$
 - (C) $\text{Cytokinesis} \rightarrow \text{mitosis} \rightarrow G1 \rightarrow G2$
 - (D) $S \rightarrow G2 \rightarrow M \rightarrow \text{Cytokinesis} \rightarrow G1$
27. Which of the following technique is used in DNA fingerprinting
- (A) Western Blotting
 - (B) Flow Cytometry
 - (C) Southern Blotting
 - (D) Northern Blotting
28. Which one of the following detectors cannot be used for the energy determination of gamma rays?
- (A) Ionization chamber
 - (B) Proportional counter
 - (C) Geiger-Muller counter
 - (D) NaI(Tl) detector
29. Which hormone is responsible for total body fluid volume?
- (A) Insulin
 - (B) Acetyl choline
 - (C) Anti-diuretic hormone (ADH)
 - (D) Glutamic acid
30. Glucagon is produced by _____ cells of _____ gland.
- (A) alpha, pancreas
 - (B) beta, pancreas
 - (C) delta, thyroid
 - (D) alpha, pituitary
31. In TEM, the specimen is placed
- (A) just below the objective lens
 - (B) just above the condenser lens
 - (C) just below the intermediate lens
 - (D) inside the objective lens
32. For the separation of DNA by electrophoresis, which of the following method is commonly used?
- (A) Agarose-vertical Neuron
 - (B) Agarose-Horizontal
 - (C) PAGE-vertical
 - (D) PAGE-horizontal
33. Which of the following statement is wrong?
- (A) UV absorption is attributable to electronic transitions.
 - (B) UV spectra provide information about valence electrons.
 - (C) IR absorption is attributable to transitions between rotational energy levels of whole molecules.
 - (D) NMR spectrometers use radio frequency EM radiations.
34. How many signals does the aldehyde $(\text{CH}_3)_3\text{CCH}_2\text{CHO}$ have in ^1H NMR and ^{13}C NMR?
- (A) Five ^1H signals and six ^{13}C signals.
 - (B) Three ^1H signals and four ^{13}C signals.
 - (C) Five ^1H signals and four ^{13}C signals.
 - (D) Three ^1H signals and six ^{13}C signals.

35. Trypsin cleaves peptide chains mainly at the carboxyl side of the amino acids lysine or arginine:
- (A) except when either is followed by proline
 - (B) except when either is followed by alanine
 - (C) except when either is followed by valine
 - (D) except when either is followed by glycine
36. An enzyme catalysed reaction was measured in the presence and absence of an inhibitor. For an uncompetitive inhibition,
- (A) only K_m is increased
 - (B) both K_m and V_{max} are decreased
 - (C) only V_{max} is decreased
 - (D) both K_m and V_{max} are not affected
37. Each polypeptide strand of the single collagen molecule has
- (A) The conformation of a right-handed helix
 - (B) The conformation of a left-handed helix
 - (C) The conformation of a parallel beta-sheet
 - (D) The conformation of an anti-parallel beta-sheet
38. Which of the organelle is not a part of GERL hypothesis?
- (A) Golgi apparatus
 - (B) Endoplasmic reticulum
 - (C) Ribosome
 - (D) Lysosome
39. When voltage 'V' is applied across a pair of electrode (cathode and anode), a potential gradient 'E' is created between the electrodes. We can calculate 'E' as:
- (A) $E = V/d$
 - (B) $E = (1/V) \times q$
 - (C) $E = (Vd)/q$
 - (D) $E = V + d$
40. Which of the following is the molecular scissors in genetic engineering
- (A) Exonucleases
 - (B) Primase
 - (C) Endonucleases
 - (D) DNA ligase
41. Which of the following is a nucleotide sequence database?
- (A) EMBL
 - (B) SWISS PROT
 - (C) PROSITE
 - (D) TREMBL
42. An action potential is an
- (A) Electrochemical nerve impulse
 - (B) High concentration of sodium in kidney
 - (C) Overload in the rumen, causing feeling of satiety
 - (D) Over balanced rugby scrum
43. Which spectroscopy is used to detect -SH group and disulphide linkages in proteins
- (A) CD spectroscopy
 - (B) Fluorescence spectroscopy
 - (C) NMR spectroscopy
 - (D) FTIR spectroscopy
44. The protein component of Rhodopsin molecule is
- (A) 11-cis retinal
 - (B) 11-trans retinal
 - (C) Retinene
 - (D) Scotopsin
45. Enzymes help to lower the activation energies of reactions by
- (A) Covalent interactions with the substrates
 - (B) Binding only with solvent molecules
 - (C) Changing reaction equilibria
 - (D) Weak interactions with the substrates
46. Which instrument is used to measure the electrical activity of the heart?
- (A) Electrocardiograph
 - (B) Electrocardiogram

(C) Sphygmomanometer

(D) Electroencephalogram

47. The antigen specificity of a particular B-cell

(A) is induced by interaction with antigen

(B) is determined only by the L-chain sequence

(C) is determined by H+L chain variable region sequences

(D) changes after isotype switching

48. Which of the following would cause a decrease in the binding affinity of Hemoglobin for oxygen?

(A) Increased pH of the blood

(B) Increased temperature of the blood

(C) Decreased BPG levels in erythrocytes

(D) Increase in blood volume

49. Cerebellum of brain is concerned with

(A) Static balance

(B) Initiation of muscular contraction

(C) Regulation of body posture and equilibrium

(D) Co-ordination of muscular movements

50. Increased calcium influx across the membrane of presynaptic neurons has which of the following effects on synaptic transmission?

(A) Increased release of neurotransmitter

(B) Increase in voltage-dependent potassium efflux

(C) Decreased release of neurotransmitter

(D) Decrease in voltage dependent neurotransmitter

x-x-x

(ROUGH WORK)

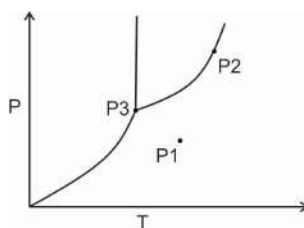
Chemistry(Ph.D.)

1. Which of the followings does not comprise "Research"?
(A) Redefining problems (B) Organizing and evaluating data
(C) Formulating hypothesis (D) Collection of known knowledge
2. The main aim of the research to discover a solution for an immediate problem of society is termed as
(A) Applied research (B) Basic research
(C) Fundamental research (D) Pure research
3. What is the correct sequence of events in the scientific method?
(A) Question, observation, hypothesis, research, data, experiment, conclusion
(B) Observation, question, research, hypothesis, experiment, data, conclusion
(C) Research, question, hypothesis, data, observation, experiment, conclusion
(D) Data, research, question, observation, hypothesis, experiment, conclusion
4. In scientific technical writing, illustration is part of
(A) Content (B) Form (C) Style (D) Language
5. Patents come under the category of
(A) Primary sources (B) Secondary sources
(C) Tertiary sources (D) None of the above
6. The preliminary reports of immediate significance with or without experimental details are called as
(A) Review articles (B) Bibliographies
(C) Communications (D) Manuals
7. Which of the following is not a method for the collection of primary data?
(A) Observation method (B) Through public records and magazines
(C) Through questionnaires (D) Through schedules
8. The relative frequency of occurrence of results in each cell can be plotted in form of bar graph which is known as
(A) Tabulation (B) Histogram (C) Captions (D) Stubs

9. The mean which signifies central tendency of a finite set of real numbers by using the product of their values is
- (A) Harmonic mean (B) Limiting mean
(C) Arithmetic mean (D) Geometric mean
10. The relative standard deviation expressed as a percent is called
- (A) Coefficient of variation (B) Sample variance
(C) Degree of freedom (D) Sample standard deviation
11. The errors having a definite value, assignable cause and of the same magnitude for replicate measurements are classified as
- (A) Random errors (B) Systematic errors
(C) Indeterminate errors (D) Gross errors
12. CCDC database services is related to
- (A) NMR Spectroscopy (B) HRMS spectrometry
(C) X-Ray crystallography (D) IR Spectroscopy
13. Which of the following comprehensive database for the chemical literature is produced by Chemical Abstracts Service (CAS)?
- (A) INSPEC (B) SciFinder (C) PubMed (D) Reaxys
14. "Turnitin" is related to
- (A) Plagiarism (B) Bribery (C) Deception (D) Sabotage
15. Precision is termed as
- (A) The closeness of a given set of observations to the true value
(B) Proximity of the measured value with the accepted value
(C) Description of systematic errors
(D) Similar results under unchanged conditions on repeated measurements
16. A hazardous symbol consisting of a human skull and two bones crossed together behind the skull is related to which substances?
- (A) Toxic (B) Explosive (C) Corrosive (D) Flammable
17. Identify the significant figure in the number 0.0069500
- (A) Eight (B) Three (C) Five (D) Seven

18. A measure of the frequency with which the average research article in a journal has been cited in a particular year is referred as
- (A) Impact factor (B) h-index (C) i10-index (D) g-index
19. In research surveys, schedules are different to questionnaires because in schedules the
- (A) Collection of data is cheap and slow
(B) Risk of wrong information and incomplete data
(C) Field staff is required
(D) Respondents are literate only
20. "Chemical Reviews" is a scientific journal published by the
- (A) Springer Nature (B) Elsevier
(C) Royal Society of Chemistry (D) American Chemical Society
21. "MSDS" document in experimental chemistry stands for
- (A) Molecule Structure Description Sheet (B) Material Safety Data Sheet
(C) Material Storage Data Sheet (D) Main Safety Description Sheet
22. A reagent prepared as standard solution of known concentration and volume in titration is known as
- (A) Indicator (B) Analyte (C) Titrant (D) Endpoint
23. " R_f " in chromatography stands for
- (A) Regulation factor (B) Remote factor
(C) Retention factor (D) Reverse factor
24. Which of the following is not the primary air pollutant?
- (A) CO (B) SO₃ (C) NO (D) CO₂
25. Appearance of deep violet colouration on treatment of sodium extract of given compound with sodium nitroprusside solution indicates the presence of
- (A) Sulphur (B) Nitrogen (C) Bromine (D) Iodine
26. The effective representation for showing the deviation of real gas from ideal behaviour is in term of
- (A) Transport number (B) Wiens effect
(C) Kohlrausch law (D) Compressibility factor

27. For the given cell reaction: $2\text{Ag}^+ + \text{Zn} \leftrightarrow 2\text{Ag} + \text{Zn}^{2+}$ with given concentration of $(\text{Zn}^{2+}) = 0.10$ M and $(\text{Ag}^+) = 10$ M, calculate the value of $\log K$ if the EMF of the cell is 1.62 V.
- (A) 51.4 (B) 52.9 (C) 53.4 (D) 54.4
28. Using Huckel molecular orbital approximation, two roots of secular equation of ethylene are
- (A) $\alpha+2\beta, \alpha-2\beta$ (B) $\alpha+\beta, \alpha$
 (C) $\alpha+\sqrt{2}\beta, \alpha-\sqrt{2}\beta$ (D) $\alpha+\beta, \alpha-\beta$
29. An organic fatty acid forms a surface film on water that obeys the two-dimensional ideal gas law. If the surface tension lowering is 10 mN m^{-1} at 25°C , the surface area per adsorbed molecule in $(\text{nm})^2$ is
- (A) 4.104 (B) 4.044 (C) 0.411 (D) 0.114
30. Soft drinks and baby feeding bottles are generally made up of
- (A) Polystyrene (B) Polyurethane
 (C) Polyamide (D) Polyester
31. Hexagonal crystal system is well described by the cell dimensions and c
- (A) $a \neq b \neq c; \alpha = \beta = \gamma = 90^\circ$ (B) $a = b = c; \alpha = \beta = \gamma = 90^\circ$
 (C) $a = b \neq c; \alpha = \beta = \gamma = 90^\circ$ (D) $a = b \neq c; \alpha = \beta = 90^\circ, \gamma = 120^\circ$
32. An aqueous solution contains 3% and 1.8% by weight of urea and glucose respectively, what is the freezing point of solution ($K_f = 1.86^\circ\text{C/m}$)?
- (A) -1.172°C (B) -1.5°C (C) 1.172°C (D) 1.5°C
33. The phase diagram of pure substance is sketch below



- (A) 1, 2, 0 (B) 2, 0, 1 (C) 2, 1, 0 (D) 0, 2, 1
34. Which of the following metals is present in the human carbonic anhydrase II?
- (A) Fe (B) Mg (C) Zn (D) Cu
35. Which of the following does not have M-M bond?
- (A) $\text{Al}_2(\text{CH}_3)_6$ (B) $\text{Co}_2\text{CO}_{10}$ (C) $\text{Mn}_2\text{CO}_{10}$ (D) $\text{Ir}_4\text{CO}_{12}$

36. Match the following.

a.	HClO ₄	I	Insoluble in water
b.	H ₂ SO ₅	II	Decomposes in water
c.	SF ₄	III	Caro's acid
d.	[Fe(CN) ₆] ³⁻	IV	Most stable conjugate base

(A) a-III, b-II, c-IV, d-I

(B) a-IV, b-III, c-I, d-II

(C) a-II, b-I, c-III, d-IV

(D) a-IV, b-III, c-II, d-I

37. Classify the following boranes; [B₈H₈]²⁻ and [B₁₁H₁₃]²⁻, respectively.

(A) Closo, Closo

(B) Nido, Nido

(C) Closo, Nido

(D) Closo, Arachno

38. Zn dissolves in a solution of sodium amide in liquid ammonia producing A and dihydrogen gas. A careful addition of ammonium iodide to the solution of A produces white precipitates of B which dissolves in the excess of ammonium iodide. Predict the A and B, respectively.

(A) Na[Zn(NH₂)₂] and Zn(NH₂)₂

(B) Na[Zn(NH₂)₄] and Zn(NH₂)₂

(C) Na[Zn(NH₂)₄] and Zn(NH₂)₄

(D) Na[Zn(NH₂)₂] and Zn(NH₂)₄

39. How many lines do you expect in the EPR spectrum of [VO(acac)₂] where Hacac = pentane-2,4-dione at 298 K (I for ⁵¹V = 7/2)?

(A) 4

(B) 6

(C) 8

(D) 10

40. Choose a correct statement.

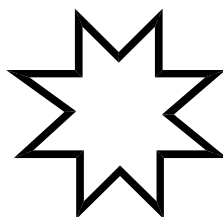
(A) Graphitic fluorides are conducting in nature.

(B) All nitrogen oxides show toxicity even at lower concentrations.

(C) Allotropic form of phosphorus P₄ has C₄ axis of rotation.

(D) XeF₆ has distorted octahedral geometry and shows fluxionality.

41. What is the highest order of rotation of the following 2-dimensional shape?



(A) C₈

(B) C₁₆

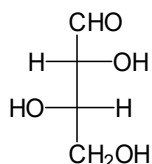
(C) C₄

(D) C_∞

42. Removal of the *t*-BOC in amino acids can be accomplished with strong acid as

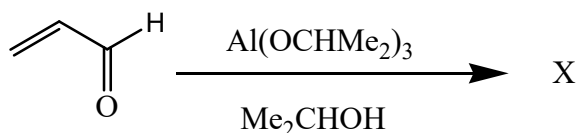
- (A) Trifluoroacetic acid (B) Acetic acid
(C) Oxalic acid (D) Benzoic acid

43. Assign *R* or *S* designation to the following molecule



- (A) 2*S*, 3*S* (B) 2*R*, 3*R* (C) 2*S*, 3*R* (D) 2*R*, 3*S*

44. Product X in the following reaction is

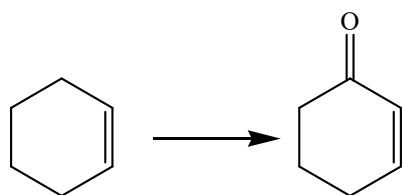


- (A) β -Methylallyl alcohol (B) Allyl alcohol
(C) Vinyl alcohol (D) β -Methylpropargyl alcohol

45. Acetophenone on treatment with peracid gives the

- (A) *t*-Butyl acetate (B) α -Methylbenzyl acetate
(C) Phenyl acetate (D) Ethyl acetate

46. The following transformation can be achieved using



- (A) LiAlH_4 (B) OsO_4 (C) $\text{C}_2\text{H}_5\text{ONa}/\text{H}^+$ (D) SeO_2

47. In which of the following rearrangement, the driving force is the electron-deficient nitrogen formed on elimination of nitrogen molecule on heating?

- (A) Fries rearrangement (B) Curtius rearrangement
(C) Benzilic rearrangement (D) Wagner-Meerwein rearrangement

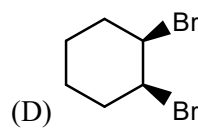
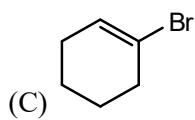
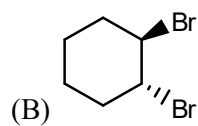
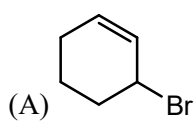
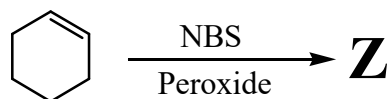
48. CH_3COCH_3 and C_2H_2 are the synthons for the synthesis of

- (A) Citral (B) Quinine (C) Santonin (D) Menthol

49. When more than one alkene can be formed, that alkene will predominate which has larger number of alkyl groups on the double-bonded carbons. This rule is known as:

- (A) Woodward rule (B) Saytzev's rule
(C) Fieser rule (D) Hofmann rule

50. The following transformation leads to the major product Z, which is



x-x-x

(ROUGH WORK)

Geology(Ph.D.)

- Which of the following is an element of image interpretation?
(A) Tone (B) Texture (C) Shape (D) All of these
- Which of the following isotopes is not a radioisotope?
(A) C 13 (B) C 14 (C) H 3 (Tritium) (D) S 35
- Strain markers
(A) Deformed objects with known original size and shape
(B) Deformed objects with known final size and shape
(C) Both of the above
(D) None of the above
- What is SAR?
(A) Synthetic Array Radar (B) Synthetic Aperture Radar
(C) Synthetic Apron Radar (D) None of these
- The procedure done on a digital image to alter the values of its individual pixels known as?
(A) Geometric Spatial Transformation (B) Single Pixel Operation
(C) Image Registration (D) Neighbourhood Operations
- GRACE satellite monitors
(A) Geomagnetism (B) Gravity (C) Land Cover (D) Plantation
- What is the basis of classification of igneous rocks by the International Union of Geological Sciences (IUGS)
(A) Mineral content (B) Element content (C) Silica content (D) Water content
- Advantages of using ultramicroscopic techniques over optical include
(A) Larger depth of field (B) Higher magnification
(C) Greater resolution (D) All of these
- In palaeontological studies, following is the most commonly used maceration technique to extract organic microfossils from rock.
(A) Base maceration (B) Acid maceration (C) Both of these (D) None of these
- Which of the following method/technique is used for sedimentary field data?
(A) Graphic logs (B) Field sketch (C) Sketch logs (D) All of these
- When Scanning Electron Microscope technique is done, the sample chamber must always be
(A) Nitrogen filled (B) Argon filled (C) At vacuum (D) None of these
- How many are the basic types of palaeocurrent pattern in palaeocurrent analysis?
(A) 3 (B) 4 (C) 5 (D) 2
- Which of the clay minerals show no change when treated with Ethylene glycol during clay mineral identification using X-ray diffraction technique?
(A) Illite, kaolinite (B) Chlorite, montmorillonite
(C) Montmorillonite, illite (D) Kaolinite, montmorillonite
- Which of the statement incorrect regarding geophysical methods?
(A) Employed in areas where surface exposures are rare or absent
(B) Examples include gravitational, magnetic, seismic
(C) Examples include thermal, radioactive, electrical
(D) Identification of geologic structure requires use of electrical logging

15. Which of the following is not a heavy mineral separation method?
 (A) Centrifuge methods (B) Gravity methods
 (C) Thermal methods (D) Magnetic methods
16. Feigl's solution is the commonly used staining method to distinguish minerals
 (A) Calcite and Ankerite (B) Calcite and Aragonite
 (C) Calcite and Siderite (D) Aragonite and Siderite
17. What will be strike of a bed if it's dip direction is S 40° E?
 (A) S 50° W (B) S 50° E- N 50° W
 (C) N 50°E - S 50°W (D) None of these
18. Radar Remote Sensing systems are an example of
 (A) Active Remote Sensing (B) Passive Remote Sensing
 (C) Geographic Information System (D) None of these
19. A mica or gypsum plate is used
 (A) to determine slow ray and fast ray (B) to determine pleochroism
 (C) to identify isotropic minerals (D) to determine interference colour
20. In a seismic shadow zone, seismographs are unable to detect
 (A) P-waves (B) S-waves (C) P and S-waves (D) Can detect both
21. How many component systems are the ACF and AKF graphical mineral plots in metamorphic petrology?
 (A) One component (B) Two component (C) Three component (D) Four component
22. Gneiss formed from sedimentary rock is
 (A) Orthogneiss (B) Paragneiss (C) Banded gneiss (D) Augen gneiss
23. What is the speciality of the Artesian Water?
 (A) Has a characteristic colour (B) Has a characteristic odour
 (C) Requires no pumping (D) Requires special type of pumping
24. Conglomerates belong to which group of sedimentary rocks?
 (A) Rudaceous rocks (B) Argillaceous rocks
 (C) Arenaceous rocks (D) All of these
25. Which among the following is an intermontane basin?
 (A) Sutlej valley (B) Valley of flowers
 (C) Kashmir valley (D) All of these
26. An animal is more likely to become fossilized if:
 (A) Left exposed to the elements
 (B) The animal dies at sea and sinks deep
 (C) The animal is a soft-bodied animal like jellyfish
 (D) All of the above
27. Petroleum bearing formations of Western Rajasthan (Barmer basin) are of which age
 (A) Quaternary (B) Mesozoic (C) Paleozoic (D) Precambrian
28. Micas are examples of
 (A) Non-metallic minerals (B) Energy minerals

- (C) Non-ferrous minerals (D) Ferrous minerals
29. Diamond is a crystal
 (A) Always True (B) Sometimes True
 (C) Always False (D) Sometimes False
30. The minimum number of satellites needed by GPS to find its position is
 (A) 2 (B) 3 (C) 4 (D) 6
31. The youngest oceanic crust is closer to the
 (A) Ocean trenches (B) Ocean bottoms
 (C) Mid ocean ridges (D) Continental shelves
32. Tectonic plates tend to relax during the
 (A) Seismic event (B) Pre-seismic cycle
 (C) Post-seismic cycle (D) Inter-seismic cycle
33. Boudinage structure is characteristic of
 (A) Compression Tectonics (B) Extension Tectonics
 (C) Salt Tectonics (D) All of these
34. Which of the following are collisional mountain belts?
 (A) Zagros mountains (B) Alps mountains
 (C) Appalachians (D) All of these
35. What is the term related to slickensides and used to express the angular relationship?
 (A) Rake (B) Tweak (C) Slick (D) Offset
36. The degree of crystallization in very fine or glassy rocks is
 (A) Holocrystalline (B) Holohyaline (C) Homohyaline (D) Homocrystalline
37. Important characteristic of Earth's primary relief is that the hypsographic curve is strongly
 (A) Polymodal (B) Bimodal (C) Unimodal (D) None of these
38. Which of the following is not characteristic of cratons?
 (A) Old and stable
 (B) Part of continental lithosphere
 (C) Composed of ancient crystalline basement rocks
 (D) Negative buoyancy and high intrinsic density
39. Which of the following is a characteristic vertebrate fossil of Middle Siwalik?
 (A) Equus (B) Camelus (C) Ramapithecus (D) Elephas nomadicus
40. Which building stone has been largely used in making Taj Mahal monument?
 (A) Makrana marble (B) Vindhyan marble
 (C) Cuddapah marble (D) Aravalli marble
41. Which mineral is responsible for the strong foliation in schist?
 (A) Quartz (B) Calcite (C) Mica (D) Olivine

42. What is another name for retrograde metamorphism?
 (A) Diaphoresis (B) Retrogressive (C) Both A & B (D) None of these
43. Columnar joints in volcanic rocks are an example of
 (A) Tension joints (B) Shear joints (C) Dip joints (D) Bedding joints
44. River erosion and deposition combined produce features such as
 (A) Knickpoints and terraces (B) Meanders and terraces
 (C) Meanders and floodplains (D) Floodplains and terraces
45. Which of the following is not a biaxial negative mineral?
 (A) Talc (B) Staurolite (C) Muscovite (D) Orthoclase
46. Darcy's law states that
 (A) Flow rate is proportional to the pressure gradient
 (B) Flow rate is not proportional to the pressure gradient
 (C) Flow rate is proportional to temperature gradient
 (D) Flow rate is proportional to both temperature and pressure gradient
47. Which habit is commonly shown by mineral kyanite?
 (A) Dendritic (B) Massive (C) Fibrous (D) Bladed
48. Which is the most common ore of lead?
 (A) Chromite (B) Bauxite (C) Galena (D) Sphalerite
49. Which of the following is not a characteristic of barchans?
 (A) It is made of sand
 (B) It is crescent shape
 (C) It lies at the right angle to the prevailing wind
 (D) It never moves in the direction of wind
50. Which of the following is non-penetrative lineation
 (A) Intersection lineation (B) Boudinage
 (C) Mullions (D) Slickenlines

x-x-x

(ROUGH WORK)

Human Genomics(Ph.D.)

1. What is sampling?
 - (A) Selection of 2 individuals from within a statistical population to estimate characteristics of the whole population
 - (B) Selection of a subset of individuals from within a statistical population to estimate characteristics of the whole population
 - (C) Selection of one individual from within a statistical population to estimate characteristics of the whole population
 - (D) Selection of ten individuals from within a statistical population to estimate characteristics of the whole population
2. What is central tendency?
 - (A) It's a central/typical value for a probability distribution
 - (B) It's a central/typical value for a statistical distribution
 - (C) It's a central value for a sampling distribution
 - (D) It's a typical value for a research distribution
3. Why is it helpful to keep a research diary or log book while you are conducting your project?
 - (A) To give you something to do in the early stages of your research when nothing is happening.
 - (B) Because funding councils generally demand to see written evidence that you were working every day during the period of the research.
 - (C) To keep a record of what you did and what happened throughout the research process.
 - (D) It can be added to your dissertation to ensure that you reach the required word limit.
4. Most of the scientific instruments in laboratories have log book to be filled by the instrument user. The purpose of such log book is
 - (A) To check which student is using the instrument more
 - (B) To record asset maintenance activities
 - (C) To know if instrument is really useful for the laboratory
 - (D) To keep a check on who mishandles the instrument
5. What makes a journal predatory?
 - (A) Journals who prioritize self-interest at the expense of scholarship
 - (B) Journals who do not allow other journals to publish
 - (C) Higher publication charges
 - (D) Publication & processing of article, free of any charges
6. The first step of research is
 - (A) Selecting a problem
 - (B) Searching a problem
 - (C) Identifying a problem
 - (D) Finding a problem

7. Bibliography given in a research report
 - (A) Has no relevance to research
 - (B) Help those interested in further research
 - (C) helps check plagiarism
 - (D) lists all the researchers and their work related to that report topic

8. Research problem is selected from the stand point of
 - (A) Researcher's interest
 - (B) Financial interest
 - (C) Availability of literature
 - (D) Social relevance

9. Research means
 - (A) Searching again and again
 - (B) Finding solution to a problem
 - (C) Working in a scientific manner to search for the truth of problem
 - (D) Validating already worked out problem

10. When a research problem is related to a heterogenous population, the best method of sampling is
 - (A) Cluster sampling
 - (B) Stratified sampling
 - (C) Lottery sampling
 - (D) Convenient sampling

11. What is Retrospective study in research
 - (A) Individuals are sampled and information is collected about their past
 - (B) Individuals are sampled and information is collected in future
 - (C) Research which helps to discover a novel event
 - (D) Research based on historical problem

12. Which one is not the characteristic of research
 - (A) Systemic
 - (B) Empirical
 - (C) Non systematic
 - (D) Replicable

13. Which of the following is a first step in writing a questionnaire?
 - (A) Describe incentives that may be involved
 - (B) Explain the purpose of questionnaire
 - (C) Self-introduction
 - (D) Reveal what would happen with data you collect

14. Systematic study directed towards greater knowledge or understanding of the fundamental aspects of phenomenon is referred to as
 - (A) Applied research
 - (B) Qualitative research
 - (C) Explanatory research
 - (D) Basic research

15. Which one of the following bibliography formats is used more for scientific and technical works
 - (A) MLA
 - (B) Chicago
 - (C) APA
 - (D) MLPA

16. Which factor indicates the quality of a research article more appropriately,
 - (A) Published in journal with high impact factor
 - (B) Publication with high citation value

- (C) Published in an expensive journal
(D) Published in an international journal
17. Plagiarism can be best explained as,
(A) the act of copying another person's ideas, words or work and pretending they are your own
(B) the act of copying your own previous idea and publishing under new title
(C) the act of stealing another person's data
(D) act of doing anything illegal
18. Ethics is the branch of
(A) Biostatistics (B) Bio medical (C) Social Science (D) Philosophy
19. Research should be to establish
(A) Conclusion (B) Truth (C) Information (D) Replication
20. The process of doing or reporting unethical research is called as
(A) Research design (B) Research ethics
(C) Research misconduct (D) Plagiarism
21. Making up of data or result and reporting them, is termed as
(A) Falsification (B) Publication (C) Plagiarism (D) Fabrication
22. Study on Smoking and lung cancer is an example of
(A) Explanatory research (B) Basic research
(C) Descriptive research (D) Correlational research
23. Which of the following is a research tool
(A) Questionnaire (B) Graph (C) Diagram (D) Illustration
24. A formal document that presents the research objectives, design of achieving these objectives, and expected outcomes of the study is called
(A) Research design (B) Research proposal
(C) Research hypothesis (D) Research report
25. The research that is especially carried out to test and validate the study hypothesis is
(A) Exploratory research (B) Fundamental research
(C) Applied research (D) Conclusive research
26. If you have to make 2000ml of 5% Alcohol from an available 20% Alcohol solution, how much of it you need
(A) 0.5ml (B) 5ml (C) 50ml (D) 500ml
27. Which of the following represents endothermic reaction
(A) Condensation of water vapour (B) Combustion of paper
(C) Sublimation of dry ice (D) Freezing of water

28. What is the SI unit of heat
 (A) Celsius (B) Joule (C) Degree (D) Kelvin
29. Which of the following functional group is not present in a carbohydrate?
 (A) Carbonyl (B) Sulfhydryl (C) Hydroxyl (D) Ether
30. Which one among the following is responsible for breaking down starch into simpler sugars
 (A) Lactase (B) Amylase (C) Maltase (D) Sucrase
31. Which one of the following is NOT true about proteins
 (A) They are soluble in water due to their size & heavy molecular mass
 (B) They are building blocks of many mammalian tissues such as muscles or bone
 (C) They are stored as a nutrient, since they yield more energy than lipids or carbs
 (D) They are useful in cells as both structural components & in chemical reactions
32. In which cellular compartment does Urea cycle predominantly occurs
 (A) Nucleus (B) Cytoplasm
 (C) Golgi bodies (D) Endoplasmic reticulum
33. During DNA replication, a short segment of RNA must form before DNA synthesis can begin. This is done by which enzyme
 (A) Helicase & Gyrase (B) DNA polymerase III
 (C) RNase H (D) Primase
34. Proteins embedded in the cellular membrane are often used for multiple functions. Which of the following is NOT a function of membrane protein?
 (A) Cell to cell adhesion (B) Receptor site for hormone
 (C) Transport of materials in/out of the cell (D) Cell nutrition
35. Which of the bonds link monosaccharides together in polysaccharides
 (A) Peptide bond (B) Glycosidic bond (C) Hydrogen bond (D) Ionic bond
36. To make 8 litres of 75% Alcohol, how much 100% Alcohol you need
 (A) 6 litres (B) 600 litres (C) 60 litres (D) 0.6 litres
37. Which of the following statement incorrectly describes PKU
 (A) Decreased amount of tyrosine
 (B) Increased amount of phenylalanine
 (C) Increased amount of phenylalanine hydroxylase
 (D) Decreased amount of phenylalanine hydroxylase
38. Which of the following best describes the group (Drosophila, C. elegans, Zebra fish & S. cerevisiae)
 (A) Animal models (B) Genetic models (C) Vertebrate models (D) Bacterial models

39. Which category of carbohydrates do the sugars glucose, fructose, and galactose belong to
 (A) Monosaccharides (B) Disaccharides (C) Polysaccharides (D) Multisaccharides
40. How does Urea cycle contribute to nitrogen balance in the body
 (A) Nitrogen excretion as ammonia (B) Nitrogen incorporation into proteins
 (C) Nitrogen elimination as nitrate (D) Nitrogen disposal as urea
41. How much bleach is needed to make 300ml, 2:15 dilution bleach solution
 (A) 8ml (B) 40ml (C) 6.4ml (D) 250ml
42. If you have to make a polyacrylamide gel to investigate five test samples for RFLP, which one of following set you would use
 (A) set of plates with 1mm spacers and 1mm comb with 10 wells
 (B) set of plates with 0.1mm spacers and 1mm comb with 5 wells
 (C) set of plates with 0.1mm spacers and 0.1mm comb with 5 wells
 (D) set of plates with 1cm spacers and 1cm comb with 7 wells
43. All of the following represents methods of high throughput sequencing except
 (A) Next generation sequencing (B) Ion Torrent technology
 (C) Pac Bio RS (D) Microarray
44. If you have to screen a known pathogenic mutation in a large number of patients (n=10,000), which of the following is best suitable
 (A) Whole genome sequencing (WGE) (B) Microarray analysis (MA)
 (C) Whole Exome sequencing (WES) (D) Clinical genome analysis (CGA)
45. Complementary DNA microarrays, Oligonucleotide microarrays or SAGE, are the tools commonly used in
 (A) Structural Genomics (B) Metabolomics
 (C) Functional Genomics (D) Bioinformatics
46. SAGE, IGVdb, IGDD and mit-o-matic are some of the examples of
 (A) Resources that can aid in genetics of complex disorders
 (B) Resources that can aid in rare genetic disease research in India
 (C) Resources that can aid in genome studies worldwide
 (D) Resources that can aid in cancer genetics research in India
47. How many different types of gametes are possible from genotype AaBbCc, considering independent assortment.
 (A) 3 (B) 6 (C) 8 (D) 9
48. By comparing concordance rates between monozygotic and dizygotic twins, one can easily predict the contribution of
 (A) Epigenetic factors (B) Stochastic factors
 (C) Non genetic factors (D) DNA sequence variants
49. A study on cigarette smoking and risk of lung cancer, looked at a group of 800 people who had lung cancer. The investigators matched each lung cancer patient with a person

of same age, sex, and race who were negative for lung cancer, then asked about their habit of cigarette smoking. This is

- (A) An observational study (B) An uncontrolled experiment
(C) A randomized comparative experiment (D) A blind experiment

50. If a mutation converts a triplet codon “UGC” to “UGA”, it is called

- (A) Missense mutation (B) Deletion mutation
(C) Nonsense mutation (D) Neutral mutation

x-x-x

(ROUGH WORK)

Statistics(Ph.D.)

- The numerical distance between two categories does not make sense in
(A) Nominal and Ratio scale (B) Ordinal and Interval scale
(C) Nominal and Ordinal scale (D) Interval and Ration scale
- The value 'Zero' is treated as an arbitrary 'Zero' in which of the following scale
(A) Ratio (B) Nominal (C) Ordinal (D) Interval
- The set of all possible outcomes of an experiment is called a/an
(A) Event (B) Sample Space (C) Random variable (D) Equivalent events
- Out of the following samplings which one is the probability sampling
(A) Stratified random sampling (B) Convenience sampling
(C) Judgement sampling (D) Quota sampling
- Increasing the sample size has the following effect upon the sampling error
(A) It increases sampling error
(B) It reduces sampling error
(C) It has no effect on sampling error
(D) Sampling error reduces for $n < 30$, but increases for > 30
- In a series of 5 Cricket matches, one of the captains called 'Heads' every time when the toss is taken. The probability that he will win 3 times and lose 2 times is
(A) $1/8$ (B) $5/8$ (C) $3/16$ (D) $5/16$
- The expected number of trials for first occurrence of a "head" in a biased coin is known to be 4. The probability of first occurrence of a "head" in the second trial is:
(A) $3/16$ (B) $7/8$ (C) $1/4$ (D) $5/18$
- A distribution with a Kurtosis value of less than 3 is called
(A) Leptokurtic (B) Hypokurtic (C) Platykurtic (D) Mesokurtic
- Consider the following statements
 - Mean and Variance of Poisson distribution are same
 - Sum of two Poisson variates is also a Poisson variateWhich of the above statements is/are correct?
(A) 1 only (B) 2 only (C) Both 1 and 2 (D) Neither 1 nor 2
- The correlation coefficient of a random sample of size 27 from a bivariate normal population is found to be 0.8. The value of t-statistic used to test for significance of the population correlation coefficient is
(A) 9.25 (B) 8.65 (C) 9.75 (D) 6.67
- The moment generating function of a random variable X is

$$M_X(t) = \frac{(1 + 3e^t)^2(3 + e^t)^3}{1024}$$

The E(X) equal to

- (A) 2.25 (B) 6.43 (C) 3.67 (D) 5.99
12. If the mean deviation about mean of a random variable X is 15, then mean deviation of $Y=3X+4$ about its mean is
 (A) 18 (B) 22 (C) 45 (D) 30
13. A, B and C are three mutually exclusive and exhaustive events. $P(A) = 2P(B) = 6P(C)$. Find $P(B)$.
 (A) 0.1 (B) 0.3 (C) 0.8 (D) 0.6
14. A lot consists of 144 ball pens of which 20 are defective and the others are good. Manu will buy a pen if it is good but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. The probability that she will buy that pen is
 (A) $31/144$ (B) $5/36$ (C) $20/36$ (D) $31/36$
15. Consider two exponentially distributed random variables X and Y , both having a mean of 0.50. Let $Z = X + Y$ and r be the correlation coefficient between X and Y . If the variance of Z equals 0, then the value of r is
 (A) -1 (B) 1 (C) -.90 (D) .98
16. The convergent sequence has only
 (A) Two limits (B) Infinite number of limits
 (C) Three limits (D) One limit
17. If the sequence is convergent, then
 (A) It has two limits (B) Bounded above but not below
 (C) It is Bounded (D) Bounded below but not above
18. A sequence $\{1/n\}$ is
 (A) Bounded (B) Unbounded
 (C) Divergent (D) Divergent and unbounded
19. The difference between the expected value of a statistic and the value of the parameter being estimated is called a:
 (A) Standard error (B) Bias (C) Sampling error (D) Non-sampling error
20. A technique for selecting a sample, using various stages is called
 (A) Cluster sampling (B) Two-stage sampling
 (C) Probability proportional to size sampling (D) Multistage sampling
21. $(1 - \beta)$ is called the
 (A) Type-1 error (B) Power of test
 (C) Type-II error (D) Acceptance region
22. Which of the following is an assumption underlying the Z-test for testing mean?
 (A) The variance of the population must be known
 (B) The variance of the population must be unknown
 (C) The graph of the data should be negatively skewed
 (D) The graph of the data should be positively skewed

23. t-test is used for testing
 (A) Equality of two variances (B) Equality of two means
 (C) Equality of more than two variances (D) Equality of two mean vectors
24. In one-way Analysis of variance (ANOVA) the total variation is split into
 (A) One component (B) Four components
 (C) Three components (D) Two components
25. The number of possible sample of size n out of N population units with replacement is
 (A) n^2 (B) N^2 (C) N^n (D) $N!$
26. Conditions for applying Central Limit Theorem (CLT) which approximate the sampling distribution of the mean with a normal distribution is
 (A) $N > 30$ (B) $n/N > 15$ (C) $N(1-P) > 25$ (D) $N < 30$
27. The critical value of the Test statistic is determined from
 (A) Sampling distribution of the statistic assuming null hypothesis to be true
 (B) Sampling distribution of the statistic assuming alternative hypothesis to be true
 (C) Calculations based on repeating the experiment
 (D) Consistency of the data
28. Which of the following is a true statement, for comparing the t distributions with standard normal
 (A) The Normal Curve is symmetrical whereas the t-distribution is positively skewed
 (B) The proportion of area beyond a specific value of "t" is less than the proportion of normal curve
 (C) Greater the degree of freedom, the more the t-distribution resembles the standard normal distribution
 (D) The Normal Curve is symmetrical whereas the t-distribution is negatively skewed
29. Randomized Block Design (RBD) is equivalent of
 (A) One-way ANOVA (B) Two-way ANOVA
 (C) Multiway ANOVA (D) ANCOVA
30. The nonparametric analogue of one-way ANOVA is
 (A) Friedman test (B) Jonkheere-Trepstra test
 (C) Kruskal Wallis test (D) Mann-Whitney test
31. The nonparametric analogue of t-test for comparing two populations is
 (A) Wilcoxon signed-rank test (B) Run test
 (C) Fisher's exact test (D) Mann-Whitney test
32. If the conditional distribution of X_1, X_2, \dots, X_n given $T=t$, does not depend on θ , for any value of $T=t$, the statistics $T=t(X_1, X_2, \dots, X_n)$ is called
 (A) Unbiased (B) Consistent (C) Sufficient (D) Efficient
33. In one-way ANOVA, there are 8 data values of life lengths of electronic bulbs under each of the four brands. The degree of freedom associated with the error is:
 (A) 28 (B) 12 (C) 3 (D) 24
34. If $\text{Var}(T_2) > \text{Var}(T_1)$, then T_1 is
 (A) Unbiased (B) Efficient (C) Sufficient (D) Consistent
35. Let X and Y are independent normal variates with mean 50 and 80 respectively and standard deviation as 4 and 3 respectively, then the distribution $X+Y$ is

- (A) $N(130, 25)$ (B) $N(130, 7)$ (C) $N(130, 3)$ (D) $N(130, 4)$
36. Variation Inflation Factor (VIF) is used to detect
 (A) Heteroscedasticity (B) Homoscedasticity
 (C) Multicollinearity (D) Autocorrelation
37. If K denotes the expectation, the variance of a random variable X is denoted as?
 (A) $2K(X)$ (B) $(K(X))^2$ (C) $K(X)^2$ (D) $K(X)^2 - [K(X)]^2$
38. The chart that are used to deal with the characteristics which are not possible to measure, but can observe as absent or present from the product is
 (A) Xbar-chart (B) R-chart (C) P-chart (D) C-chart
39. If the value of Durbin-Watson's d Statistic = 2, the value of coefficient of autocorrelation is
 (A) One (B) Three (C) More than 4 (D) Zero
40. In Two-way ANOVA with 'p' rows and 'q' columns, the error degrees of freedom are
 (A) $p-1$ (B) $q(p-1)$ (C) $(p-1)(q-1)$ (D) $p(q-1)$
41. R-square refers to
 (A) Coefficient of determination (B) Coefficient of correlation
 (C) Partial correlation (D) Coefficient of variation
42. If the value of Durbin-Watson test statistics d is less than 2, then there is
 (A) Negative autocorrelation (B) No autocorrelation
 (C) Partial autocorrelation (D) Positive autocorrelation
43. Multicollinearity refers to a situation in which
 (A) Successive error terms derived from the application of regression analysis to time series data are correlated.
 (B) There is a high degree of correlation between the independent variables included in a multiple regression model.
 (C) The dependent variable is highly correlated with the independent variable(s) in a regression analysis.
 (D) The application of a multiple regression model yields estimates that are nonlinear in form.
44. If A and B are two matrices of the same order then, Eigenvalues of AB is equal to
 (A) Eigen values of $(A+B)$ (B) Eigen values of $(A-B)$
 (C) Eigen values of (BA) (D) Eigen values of $(A+B-I)$
45. If A is a square matrix, then its trace is
 (A) Product of diagonal elements (B) Zero
 (C) Identity (D) Sum of its diagonal elements
46. The distribution underlying the probit model is
 (A) Normal distribution (B) Logistic distribution
 (C) Chi-square distribution (D) Pareto-distribution
47. Consumer's price index numbers are calculated by
 (A) Fisher's formula (B) Paasche's formula

(C) Marshall-Edgeworth formula (D) Lespeyre's formula

48. Fisher's method of calculating the index number is based on the
(A) Arithmetic mean (B) Geometric mean
(C) Harmonic mean (D) Weighted Arithmetic mean
49. If the regression line of Y on X is $Y = 30 - 0.9X$ and the standard deviations are $S_x = 2$ and $S_y = 9$, then the value of the correlation coefficient $r(x,y)$ is :
(A) -0.3 (B) 0.2 (C) -0.2 (D) 0.4
50. In the regression model ($y = a + bx$) where $\bar{x} = 2.50$, $\bar{y} = 5.50$ and $a = 1.50$ (\bar{x} and \bar{y} denote mean of variables x and y and a is a constant), which one of the following values of parameter 'b' of the model is correct?
(A) 1.60 (B) 1.75 (C) 2.00 (D) 2.50

x-x-x

(ROUGH WORK)

Zoology(Ph.D)

1. In flow cytometry, side-scatter helps to
 - (A) Measure fluorescence intensity
 - (B) Discriminate cells with varying granularity
 - (C) Discriminate cells with varying weight
 - (D) Discriminate cells by size
2. Which of the following software is used as a reference manager?
 - (A) Viper
 - (B) Turnitin
 - (C) Urkund
 - (D) Mendeley
3. A scientist wants to study the effect of an antidiabetic drug on the blood sugar level. For this study he notes down the blood sugar level of 30 patients and then administers the antidiabetic drug to these patients. After a month treatment, he again measures the blood sugar level of the same patients. Which of the following is the most appropriate statistical test to measure the statistical significance of antidiabetic drug in blood sugar level?
 - (A) Unpaired t-test
 - (B) Paired t-test
 - (C) Analysis of variance
 - (D) Chi-square test
4. How many dependent variables are used in multiple linear regression?
 - (A) One
 - (B) Two
 - (C) Three
 - (D) More than two
5. Distance between two loci in a physical map of chromosome is defined by
 - (A) Map unit
 - (B) Centi Morgan
 - (C) Recombination frequency
 - (D) Number of base pairs
6. Plagiarism detection software checks plagiarism by providing
 - (A) Citation index
 - (B) Content index
 - (C) Similarity index
 - (D) Identity Index
7. Which of the following detector in gas chromatography is used to collect the sample after analyzing it in such a way that it does not destroy the sample
 - (A) Thermal conductivity detector
 - (B) Mass spectrometer
 - (C) Flame Ionization Detector
 - (D) Photomultiplier tube

8. What process involves subjecting fish to cold or heat treatment briefly before freezing?
(A) Canning
(B) Glazing
(C) Blanching
(D) Icing
9. The colonies of recombinant bacteria appear white in contrast to blue colonies of non-recombinant bacteria in Recombinant DNA technology because of:
(A) Insertional inactivation of lacZ gene in recombinant bacteria.
(B) Inactivation of X-gal gene in recombinant bacteria.
(C) Inactivation of X-gal gene in non-recombinant bacteria.
(D) Insertional inactivation of lacZ gene in non-recombinant bacteria.
10. Shannon's index measures the diversity of an area taking into consideration
(A) Only the number of species in an area
(B) Only the overall abundance of species in an area
(C) Both species richness and abundance
(D) Correlation between the alpha and beta diversity
11. What does 'ICP-MS' stand for?
(A) Inductively coupled plasma mass spectrometry
(B) Inductively coupled proton mass spectrometry
(C) Intensively coupled plasma mass spectrometry
(D) Interaction coupled proton mass spectrometry
12. The denominator in calculating the General Fertility Rate is:
(A) Women in age group of 18-35 years
(B) All surviving women; no age consideration
(C) Married women in the age group of 15-49 years
(D) Women in age group of 15-49 years
13. In Phase contrast microscopy, the rate at which light enters through object is
(A) Inversely proportional to their refractive indices
(B) Directly proportional to their refractive indices
(C) Exponentially related to their reflective indices
(D) Inversely proportional to their reflective indices
14. Which of the following cleaves the hairpin to form pre-miRNA:
(A) DICER
(B) DROSHA
(C) RSIC
(D) EXPORTIN

15. During agarose gel electrophoresis, where will you find the smallest fragment of DNA?
(A) Inside the well only.
(B) Near the negative electrode, close to the wells.
(C) Near the positive electrode, far away from the wells.
(D) In the middle.
16. Which of the following is a 4 base cutter restriction enzyme:
(A) Not I (B) Alu I (C) BamH I (D) Sal I
17. Bridge amplification is characteristic feature of which of the following sequencing technologies?
(A) Illumina
(B) Nanopore
(C) PacBio
(D) Pyrosequencing
18. A nonparametric version of the parametric analysis of variance test is
(A) Mann-Whitney-Wilcoxon Test
(B) Sign-test
(C) Kruskal-Wallis Test
(D) Wilcoxon Signed-rank test
19. NK cells CD marker is
(A) 60 (B) 32 (C) 16 (D) 25
20. In ELISA, to stop the reaction between enzyme and substrate, what process is needed?
(A) Add strong base to the sample
(B) Add strong acid to the sample
(C) Wash sample with PBS-Tween
(D) Add blocking solution to sample
21. During tissue staining process, clearing is done by:
(A) Gradual run thru decreasing conc of alcohol, 5 minute each
(B) 3 changes of xylol, 2 minute each
(C) 2-3 changes of xylene for 1 minute
(D) 8-10 changes of absolute alcohol, 2 minute each
22. Which rule is used when counting cells in a hemocytometer?
(A) North East Rule
(B) East South Rule
(C) South West Rule
(D) North West Rule

23. Which of the following qualitative tests is used to detect the presence of pentose sugars:
- (A) Barfoed's test (B) Bial's test
(C) Seliwanoff's test (D) Bradford test
24. Role of internal primers in Nested PCR is to
- (A) Decrease annealing temperature
(B) Initiate DNA synthesis
(C) Enhance specificity
(D) Increase sensitivity
25. Areas of scientific dishonesty does not include:
- (A) Poor data storage and retention
(B) Non publication of data
(C) Misleading authorship
(D) Issuing corrigendum to an article
26. To work with *Mycobacterium tuberculosis* strain, which of the following facilities are required:
- (A) Biosafety Level 1 (BSL-1)
(B) Biosafety Level 2 (BSL-2)
(C) Biosafety Level 3 (BSL-3)
(D) Only hospital environment
27. Which common fungus affects fish eggs?
- (A) *Aspergillus sp.* (B) *Aphanomyces sp.*
(C) *Ichthyophthirius sp.* (D) *Saprolegnia sp.*
28. Which of the following is a pluripotency marker?
- (A) CD8 (B) OCT4 (C) Tyrosinase (D) Nestin
29. The connecting link between HMP shunt and lipid synthesis is
- (A) Ribose
(B) NADPH
(C) Sedoheptulose 7 phosphate
(D) NADH
30. Identify the parasite:
Male: 1 cm by 1mm, 8-9 testes, female: 1.4 cm by 0.25 mm, 1-3 eggs (usually 1) in uterus, eggs with lateral spine; intermediate host: *Biomphalaria* and mesenteric plexus of sigmoido-rectal area is its habitat.
- (A) *Schistosoma japonicum*
(B) *Schistosoma haematobium*
(C) *Schistosoma mansoni*
(D) *Schistosoma intercalatum*

31. The prevalence of a disease in a population increases if
 (A) Incidence rate of the disease remains constant.
 (B) Survival time with the disease increases.
 (C) Recovery of the disease is faster.
 (D) Population in which the disease is measured increases.
32. Which of the following neurotransmitter is released by 'rod cells' of retina:
 (A) Adrenaline
 (B) Dopamine
 (C) Glutamate
 (D) Serotonin
33. Which of the following is telomere repeat in humans:
 (A) 5'-TTTGGG-3'
 (B) 5'-TTAGGG-3'
 (C) 5'-TTGGGG-3'
 (D) 5'-TTTCGG-3'
34. Nitrous acid causes mutations by:
 (A) Deaminating cytosine
 (B) Forming purine-pyrimidine dimers
 (C) By acidifying adenine
 (D) By adding amino group to adenine
35. 'Familial Down syndrome' arises due to
 (A) Deletion of part of chromosome 21 and 14
 (B) Robertsonian translocation between chromosome 21 and 14
 (C) Inversion of chromosome 21
 (D) Attachment of part of chromosome 20 to chromosome 21
36. Which stage in the life cycle of *Citrus psylla* damages the host plant
 (A) Nasute
 (B) Nymph
 (C) Semilooper
 (D) Pupa
37. Which of the following statement is incorrect regarding the Paleozoic era?
 (A) Explosion of new and extensive life forms.
 (B) It lasted from 542 to 251 million years ago, approximately.
 (C) K-T mass extinction occurred in this era.
 (D) Three mass extinctions happened in this era.
38. The fossil 'Tiktaalik' is an example of transition from:
 (A) Agnathans to Gnathostomes
 (B) Land to sea mammals
 (C) Land mammals to whales
 (D) Aquatic habitat to terrestrial animals

39. Which of the following would best predict how likely someone is to blow out all their birthday candles in a single breath?
- (A) Vital Capacity (VC)
 - (B) Tidal Volume (TV)
 - (C) Functional Capacity (IC)
 - (D) Inspiratory Reserve Volume (ERV)
40. If bicoid mRNA is injected into the posterior pole in wild type *Drosophila* embryo, the expected phenotype is
- (A) Head structure at both the ends
 - (B) Head structure at the posterior end only
 - (C) Tail structure at the posterior end only
 - (D) Tail structure at both the ends
41. Which of the following hormone inhibit the secretion of gastric acid from the parietal cells of the stomach?
- (A) Gastrin
 - (B) Secretin
 - (C) Rennin
 - (D) Pepsin
42. Traits that display continuous phenotypic variation are usually determined by which form of inheritance?
- (A) Dominant-recessive inheritance
 - (B) Sex-linked inheritance
 - (C) Polygene inheritance
 - (D) Multiple-allele inheritance
43. *uvrABC* is an example of which of the following type of DNA repair mechanism:
- (A) Mismatch repair
 - (B) Nucleotide excision
 - (C) SOS repair
 - (D) Photoreactivation
44. Which of the following is a biopesticide
- (A) *Eicchorhia*
 - (B) *Parthenium*
 - (C) *Rotenone*
 - (D) *Trichomonas*
45. Which of the following pairs is true for fleas as vectors
- (A) *Yersinia*, Plague
 - (B) *Leishmania*, Kala azar
 - (C) *Salmonella*, Typhoid
 - (D) *Trypanosoma*, Sleeping sickness

46. Which of the following enzymes catalyses an irreversible reaction in glyconeogenesis?
(A) Hexokinase
(B) Phosphofructokinase
(C) Pyruvate kinase
(D) Pyruvate carboxylase
47. Which of the following is not evidence of continental drift?
(A) *Lystrosaurus*
(B) *Archaeopteryx*
(C) *Glossopteris*
(D) *Cynognathus*
48. The Caribbean is a part of which of the following zoogeographical realms
(A) Palearctic realms
(B) *Nearctic realms*
(C) Neotropical realms
(D) *Ethiopian realms*
49. Which of the following is not a Yamanaka factor?
(A) Oct3/4
(B) Sox2
(C) Klf4
(D) MMP-9
50. Stem cells which can differentiate into embryonic and extra-embryonic tissue are:
(A) Totipotent stem cells
(B) Pluripotent stem cells
(C) Multipotent stem cells
(D) Induced pluripotent stem cells

x-x-x

(ROUGH WORK)

Microbiology(Ph.D.)

1. Research and Development become the index of development of the country. Which of the following reasons are true with regards to this statement?
(A) R&D targets human development
(B) R&D can enhance people's standard of living in the country
(C) R&D reflects the actual economic and social conditions being prevailed in the country
(D) All the above
2. Which one among the following statement is true in the context of the testing of hypotheses?
(A) It is only the alternative hypotheses that can be tested.
(B) It is only the null hypotheses that can be tested.
(C) Both the alternative and the null hypotheses can be tested.
(D) Both the alternative and the null hypotheses cannot be tested.
3. Which one among the following statements is false in the context of participatory research?
(A) It recognizes knowledge as power
(B) It is a collective process of inquiry
(C) It emphasizes people as experts
(D) Its sole purpose is the production of knowledge
4. A comprehensive full Report of the research process is called
(A) Thesis (B) Summary Report (C) Abstract (D) Article
5. Final stage in the Research Process is
(A) Problem formulation (B) Data collection
(C) Data Analysis (D) Report Writing
6. What are the core elements of a Research Process?
(A) Introduction; Data Collection; Data Analysis; Conclusions and Recommendations
(B) Executive Summary; Literature Review; Data Gathered; Conclusions; Bibliography
(C) Research Plan; Research Data; Analysis; References
(D) Introduction; Literature Review; Research Methodology; Results; Discussions and Conclusions
7. A formal document that presents the research objectives, design of achieving these objectives, and the expected outcomes/deliverables of the study is called
(A) Research design (B) Research proposal
(C) Research hypothesis (D) Research report
8. An image, perception or concept that is capable of measurement is called
(A) Scale (B) Hypothesis (C) Type (D) Variable

9. Why do you need to review the existing literature?
 (A) To make sure you have a long list of references
 (B) Because without it, you could never reach the required word-count
 (C) To find out what is already known about your area of interest
 (D) To help in your general studying
10. What do you mean by Unit of Analysis?
 (A) Main parameter (B) Variables (C) Sample (D) Constructs
11. In order to pursue the research, which of the following is priorly required?
 (A) Developing a research design
 (B) Formulating a research question
 (C) Deciding about the data analysis procedure
 (D) Formulating a research hypothesis
12. Which of the following features are considered as critical in qualitative research?
 (A) Collecting data with the help of standardized research tools.
 (B) Design sampling with probability sample techniques.
 (C) Collecting data with bottom-up empirical evidence.
 (D) Gathering data with top-down schematic evidence.
13. What is the name of the conceptual framework in which the research is carried out?
 (A) Research hypothesis (B) Synopsis of Research
 (C) Research paradigm (D) Research design
14. Which one among the following phrases does not correspond to the meaning of research as a process?
 (A) Problem Solving (B) Trial and Error
 (C) Objective Observation (D) Systematic Activity
15. What is the best-suited name for a process that doesn't necessitate experimental research?
 (A) Manipulation (B) Controlling (C) Content analysis (D) Observation
16. What are those conditions where a research problem is not viable?
 (A) It is new and adds something to knowledge
 (B) It can be researched
 (C) It has utility and relevance
 (D) It contains dependent and independent variables
17. Authenticity of a research finding is its
 (A) Validity (B) Objectivity (C) Originality (D) All of these
18. Circle graphs are used to show
 (A) How is one part related to other parts?
 (B) How various sections share in the whole?
 (C) How is one whole related to another whole?
 (D) How are various parts related to the whole?
19. Which of the following is not the method of Research?
 (A) Survey (B) Historical (C) Observation (D) Philosophical

20. Who can successfully conduct Research?
 (A) Has studied research methodology (B) Someone who is a hard worker
 (C) Possesses post-graduation degree (D) Possesses thinking and reasoning ability
21. How to judge the depth of any research?
 (A) By research title (B) By research duration
 (C) By research objectives (D) By total expenditure on research
22. The main aim of the scientific method in the research field is to
 (A) Improve data interpretation (B) Confirm triangulation
 (C) Introduce new variables (D) Eliminate spurious relations
23. What is the main aim of interdisciplinary research?
 (A) To over simplify the problem of research
 (B) To bring out the holistic approach to research
 (C) To create a new trend in research methodology
 (D) To reduce the emphasis on a single subject in the research domain
24. Which of the following does not correspond to characteristics of research?
 (A) Research is not passive (B) Research is systematic
 (C) Research is not a problem-oriented (D) Research is not a process
25. Evaluation Research is concerned with
 (A) How well are we doing? (B) Why are we doing?
 (C) What are we doing? (D) None of these
26. The ability of a pathogen to spread in the host tissues after establishing the infection is known as
 (A) Adhesion (B) Invasiveness (C) Toxicogenicity (D) None of these
27. The image obtained in a compound microscope is
 (A) Real (B) Virtual (C) Real inverted (D) Virtual inverted
28. Which one of the following is about Herpes viruses?
 (A) Icosahedral, with envelope, ds DNA (B) Polyhedral with envelope, ds DNA
 (C) RNA, helical with envelope (D) ds DNA, brick shape
29. Cholera red reaction is identified by
 (A) Sulphuric acid (B) Nitric acid (C) Hydrochloric acid (D) Carboic acid
30. Peptone water medium is an example of
 (A) Synthetic medium (B) Semisynthetic medium
 (C) Differential medium (D) None of these
31. Kauffmann white scheme is used to detect
 (A) *Salmonella* spp. (B) *Shigella* spp.
 (C) *E. coli* (D) None of these
32. The formation spindle fibres in the process of cell division is prevented by
 (A) Colchicine (B) ATP (C) Hydrazine (D) All of these
33. The following disease are caused by Mycoplasma except
 (A) Pneumonia in human beings (B) Little leaf of Brinjal

- (C) Dwarf disease of Mulberry (D) Citrus canker
34. The protein moiety of an enzyme is known as
 (A) Holo enzyme (B) Apo enzyme (C) Co enzyme (D) Enzyme
35. Nitrites are oxidized to nitrates by a microorganism
 (A) *Nitrosomonas* (B) *Nitrosococcus* (C) *Nitrobacter* (D) *Azotobacter*
36. The principle in microbiological assays is
 (A) At certain range the concentration of growth factor will bear a linear relationship to the amount of nutrients added
 (B) Concentration of growth factor have a linear relationship with the growth of the organism
 (C) Both A and B
 (D) None of the above
37. In bacteria, the increase in population is in the manner
 (A) Geometric progression (B) Multiplication
 (C) Doubling (D) None of these
38. The genetic material in HIV is
 (A) ds DNA (B) ss DNA (C) s RNA (D) None of these
39. Microorganisms usually make acetyl CO-A by oxidizing
 (A) Acetic acid (B) Pyruvic acid (C) α -ketoglutaric acid (D) Fumaric acid
40. Antigenic variation is most extensive in
 (A) Influenza virus (B) Small pox virus (C) Measles virus (D) Herpes virus
41. What is the similarity between IgM & IgG?
 (A) A compliment fixation (B) Placental transport
 (C) Heat stability at 56°C (D) Sedimentation coefficient
42. β -lactum ring is present in
 (A) Erythromycin (B) Penicillin (C) Tetracyclins (D) Chloramphenical
43. Which algae is pathogenic to human?
 (A) Cephaleouros (B) Ulothrix (C) Macrocystis (D) Prototheca
44. A major ingredient of penicillin production medium is
 (A) Corn meal (B) Corn steep liquor
 (C) Cane steep liquor (D) None of these
45. *Aspergillusniger* is used generally for the production of
 (A) Ethanol (B) Penicillin (C) Citric acid (D) Lactic acid
46. Antifoam agent is
 (A) Silicon compounds (B) Corn oil
 (C) Soyabean oil (D) All of these
47. Batch fermentation is also called
 (A) Closed system (B) Open system
 (C) Fed-batch system (D) None of these

48. Which of the following involves the formation of nitrate from ammonia
(A) Ammonification (B) Denitrification (C) Nitrification (D) Nitrogen fixation
49. Meosomes are also known as
(A) Mitochondria (B) Endoplasmic reticulum
(C) Plasmids (D) Chondroids
50. The test used to detect the deamination of the amino acids by bacteria
(A) Nessler's reagent test (B) Proteolytic test
(C) Lactose test (D) Rose aindole reagent test

x-x-x

(ROUGH WORK)

Nanoscience & Nanotechnology(Ph.D.)

1. Which term is used for piecing together segments of text from various sources with minimal alteration, creating a collection of ideas and phrases without substantial original contribution or synthesis?
(A) Self plagiarism (B) Patchwriting plagiarism
(C) Collusion (D) Plagiarism of ideas
2. What level of tolerance is allowed for plagiarism in the core work carried out by students, faculty, staff, and researchers?
(A) 0 % (B) 60 % (C) 15 % (D) 25 %
3. Which of the following is not categorized under academic dishonesty?
(A) Plagiarism (B) Deception (C) Cheating (D) Paraphrasing
4. Which of the following methods is used for collecting primary data?
(A) Observation method (B) Through questionnaires
(C) Through schedules (D) All of the above
5. Which of the following is a generally accepted principle of tabulation?
(A) The table's title should be placed below the body of the table.
(B) Each table should be given a distinct number for easy reference.
(C) Column headings should be lengthy and detailed.
(D) Units of measurement under each heading should be omitted if they are the same.
6. Which data base is useful to get comprehensive information about chemical, bioactivity and genomic data of 1 million bioactive compounds?
(A) ChEMBL (B) NCI (C) ChemDB (D) DrugBank
7. The following journal metric explains the citation of last two years?
(A) Citescore (B) H5 index (C) Impact factor (D) i10 index
8. Which one of the following is the indexing agency for journals?
(A) NASA (B) SCOPUS (C) TADA (D) MHRD
9. The program in computer is known as?
(A) Trade secret (B) Artistic work (C) Standard work (D) Literary work
10. The five years journal metric is known as
(A) Article influence (B) Impact factor
(C) Citation (D) Chemical Abstracts
11. Who introduced the Chemistry Citation Index?
(A) Robert S. Kerns (B) John Wiley
(C) Eugene Garfield (D) Michael C. Heller
12. Which of the following is not a component of the Chemistry Citation Index?
(A) Citation index (B) Source index
(C) Permuterm subject index (D) Bibliographic index
13. Which of the following is not an essential part of patents?
(A) Novelty (B) Fixation (C) Obviousness (D) Utility

14. Which of the following services provided by NCSI is used to obtain photocopies of papers?
(A) Current Awareness Service (CAS) (B) CD-ROM Database Service (CDRS)
(C) Document Delivery Service (DDS) (D) Numeric Data Source Service (NDSS)
15. Which organization published Chemical Abstracts in print from 1907 to 2009?
(A) Royal Society of Chemistry (B) American Chemical Society
(C) Elsevier (D) Wiley
16. Which one of the following is not a type of research report?
(A) Subject text book (B) Research paper (C) Thesis (D) Dissertation
17. The validity of patent is granted from?
(A) The day of closing the objections (B) The day patent is granted
(C) The day of receiving objections (D) The day of filling the patent
18. Which of the following is not typically involved in the plagiarism checking?
(A) Turnitin (B) Urkund (C) Latex (D) Scribbr
19. The following is not an Intellectual Property Law in India?
(A) Copyright Act (B) Patents Act (C) Trademark Act (D) I.T Act
20. If the p-value in a one-way ANOVA is less than 0.05, what does this indicate?
(A) The group means are likely equal
(B) There is insufficient evidence to reject the null hypothesis
(C) There is significant evidence to reject the null hypothesis
(D) The variance within groups is equal to the variance between groups
21. Which of the following is a measure of dispersion in a dataset?
(A) Mean (B) Median (C) Range (D) Mode
22. Which test is used to determine if there is a significant difference between observed and expected frequencies?
(A) t-test (B) Chi-square test
(C) ANOVA (D) Pearson correlation
23. Which tool is commonly used for searching chemical information in computer networks?
(A) SciFinder Scholar (B) Scopus
(C) Web of Science (D) PubMed
24. Which statistical test is used to compare the means of three or more groups?
(A) t-test (B) Chi-square test
(C) ANOVA (D) Correlation analysis
25. Which method of data collection involves gathering information directly from respondents using a structured set of questions?
(A) Observation method (B) Questionnaire method
(C) Archival research (D) Experimentation

26. Which property of nanoparticles often differs from their bulk counterparts?
 (A) Colour (B) Melting point
 (C) Electrical conductivity (D) All of these
27. The following motion of particles is mainly analysed in DLS?
 (A) Translational motion (B) Rotational motion
 (C) Brownian motion (D) Vibrational motion
28. Which of the following is an advantage of using nanotechnology in drug delivery?
 (A) Targeted delivery to specific cells (B) Larger dosage sizes
 (C) Slower absorption rate (D) Reduced effectiveness
29. What does zeta potential measure in nanoparticles?
 (A) Thermal stability (B) Magnetic property
 (C) Surface charge (D) Optical Property
30. What information can be obtained from the peaks in a PXRD pattern?
 (A) Molecular weight of the sample (B) Crystalline structure of the sample
 (C) Color of the sample (D) Thermal conductivity of the sample
31. Surface topography of nanoparticles is accessed by?
 (A) Atomic force microscopy (B) Dynamic light scattering
 (C) Raman spectroscopy (D) Energy-dispersive X-ray spectroscopy
32. One-billionth of a meter is better represented by?
 (A) Micrometre (B) Picometre (C) Femtometre (D) Nanometre
33. The size and shape of nanoparticles is easily accessed by using following techniques?
 (A) Transmission electron microscope (B) Fluorescence spectroscopy
 (C) Fourier-transform infrared spectroscopy (D) Ultraviolet-visible spectroscopy
34. With the decrease in size, the following property of particles increases?
 (A) Roughness (B) Intensity
 (C) Surface area (D) Toughness
35. Primary usage of energy-dispersive X-ray spectroscopy (EDX) is?
 (A) Measuring particle size (B) Analyzing elemental composition
 (C) Detecting thermal stability (D) Observing optical properties
36. The following property is often enhanced due to the high surface area-to-volume ratio at the nanoscale?
 (A) Chemical reactivity (B) Transparency
 (C) Weight (D) Hardness
37. Surface area of nanoparticles is determined by using?
 (A) Thermogravimetric analysis (TGA) (B) X-ray photoelectron spectroscopy (XPS)
 (C) Scanning tunneling microscopy (STM) (D) Brunauer-Emmett-Teller (BET) analysis
38. Nanofabrication via top-down approach includes?
 (A) Molecular self-assembly
 (B) Deposition of atomic layers
 (C) Etching away material to create nanomaterials

- (D) Crystallization of nanoparticles
39. Magnetic properties of nanoparticles are studied by using?
 (A) Fluorescence spectroscopy (B) Vibrating sample magnetometry (VSM)
 (C) X-ray diffraction (XRD) (D) X-ray photoelectron spectroscopy
40. Key component of a FTIR spectrometer?
 (A) Laser source (B) Interferometer
 (C) Mass analyzer (D) Electron microscope
41. Carbon dots were discovered in the year?
 (A) 2004 (B) 2006 (C) 2008 (D) 2010
42. Optical properties in nanoparticles are mainly affected by?
 (A) Charge (B) Toxicity
 (C) Mechanical strength (D) Quantum confinement effect
43. Functionalization of nanoparticles mainly causes?
 (A) Increment in size (B) Decrement in surface area
 (C) Retard agglomeration (D) Increase nucleation
44. Quantum dots have size range between?
 (A) < 100 nm (B) > 10 nm (C) 100-200 nm (D) < 1000 nm
45. Variations in electronic and optical properties due to quantum confinement are best explained by?
 (A) Thermodynamic laws (B) Heisenberg's uncertainty principle
 (C) Boltzmann distribution law (D) Maxwell's equations
46. Unit of measurement for Raman shift is given by?
 (A) Hz (B) nm (C) eV (D) cm^{-1}
47. Which property of carbon nanotubes makes them ideal for use in electronics?
 (A) High electrical conductivity (B) Low melting point
 (C) High optical absorption (D) Magnetic properties
48. Fullerenes stability is mainly associated with?
 (A) Ionic bonds (B) Metallic bonds
 (C) Covalent bonds (D) Hydrogen bonds
49. Steric stabilization of nanomaterials is not done by?
 (A) Physically absorbed surfactants (B) Non- absorbing polymers
 (C) Chemically absorbed polymers (D) Physically absorbed Polymers
50. The color of gold in nanometric range is?
 (A) Red (B) Golden (C) Silver (D) Green

x-x-x

(ROUGH WORK)

Physics(Ph.D.)

1. Research is performed for
(A) Improving qualification (B) Adding to one's reputation
(C) Adding to existing knowledge (D) Meeting the job requirements
2. A family has a man, his wife and three sons and two daughters. Each of the son has a daughter and two sons, while each of daughter has two sons. What is the total number of male members in the family:
(A) 12 (B) 14 (C) 16 (D) 10
3. If the linear scale on the map is magnified from 1: 5000 to 1: 25000, then the area magnification shall be:
(A) 5 (B) 10 (C) 25 (D) 50
4. A detailed description of methodology of research is required in
(A) Thesis/ Dissertation (B) Workshop/ Seminar
(C) Conference/ Seminar (D) Review article
5. With which stage of research has a direct role of Research Ethics
(A) Defining and delimiting the scope of research
(B) Problem formulation and reporting of research findings
(C) Defining the population and deciding the sampling technique for research
(D) Deciding about statistical techniques and data analysis
6. Of the following which is not the cause of non-sampling errors:
(A) Inadequate methods of data collection (B) Data tabulation
(C) Inadequate sample (D) Non response of subject
7. When the relationship is quantitative in nature, the appropriate statistical tool for discovering the mathematical relation is:
(A) Sampling Theory (B) Correlation
(C) Average (D) Regression Analysis
8. The h-index of 30 implies that the author has published
(A) at least 30 papers, of which each has been cited at least 30 times.
(B) at least 3 papers, of which each has been cited more than 30 times.
(C) at least 30 papers, of which each has been cited exactly 3 times.
(D) at least 3 papers, of which each has been cited exactly 10 times.
9. The term Plagiarism refers to
(A) Illegal duplication of print and electronic work.
(B) Converting data in survey and research reports.
(C) Making errors in paraphrasing or citations.
(D) Presenting ideas and expressions of others without acknowledgement.
10. Which of the following is not a scientific site?
(A) Scopus (B) Web of Science
(C) Research gate (D) Google plus
11. Field survey is related to
(A) Real life situations (B) Experimental Situations

- (C) Laboratory Situations (D) Hypothetical Situations
12. The closeness of the measured value to the standard value is referred to as
(A) Precision (B) Accuracy (C) Replication (D) Duplication
 13. A man is facing north and turns 135° in clockwise direction. Subsequently he turns 180° in anticlockwise direction. What is his final direction?
(A) North East (B) South West (C) North West (D) South East
 14. Keeping all the parameters same, if the standard deviation is quadrupled, then the resultant variance shall increase:
(A) 4 times (B) 8 times (C) 16 times (D) 2 times
 15. A bag contains red and green marbles. Green marbles constitutes 60% while there are 32 red marbles in the bag, then total number of marbles in the bag are:
(A) 84 (B) 80 (C) 96 (D) 108
 16. If $\frac{3}{5}$ of a number is equal to the $\frac{1}{3}$ of another number, then ratio of first number to the second one is:
(A) 8:5 (B) 1:5 (C) 5:9 (D) 9:5
 17. Which one of the following is a research tool?
(A) Graph (B) Illustration (C) Questionnaire (D) Diagram
 18. Which one of the following is least important in effective communication:
(A) Adequate command on language. (B) Good vocabulary.
(C) Attractive personality of speaker. (D) Expertise in subject.
 19. If the side of a square 1.62m, then its area shall be:
(A) 2.62m^2 (B) 2.6244m^2 (C) 2.624m^2 (D) 2.6m^2
 20. Ethical norms in the research do not involve the guidelines for:
(A) Thesis format (B) Copyright
(C) Patenting policy (D) Data sharing policies
 21. Median of array of numbers 36, 72, 49, 45, 60, 33, 61, 72 and 52 is
(A) 33 (B) 52 (C) 61 (D) 60
 22. How many digits are present in ISSN:
(A) 8 (B) 10 (C) 12 (D) 16
 23. Which of the following is not an anti-plagiarism software?
(A) Turnitin (B) Urkund (C) Grammarly (D) Mendeley
 24. A bag contains 6 red and 8 green balls. If two balls are drawn at random, then the probability that first ball is red and second ball is green, is
(A) $\frac{48}{91}$ (B) $\frac{24}{91}$ (C) $\frac{4}{13}$ (D) $\frac{1}{48}$
 25. Select the missing term from the number series: 320, 432, 304, 448, 288, ?
(A) 442 (B) 452 (C) 456 (D) 462
 26. Silver has FCC structure. If inter-atomic separation between atoms 0.288nm then the lattice constant is
(A) 0.204nm (B) 0.408nm (C) 0.144nm (D) 10nm

27. Which of the following magnetic phenomena is temperature independent
 (A) ferromagnetism (B) paramagnetism (C) ferrimagnetism (D) diamagnetism
28. Which of the following phenomena indicate the onset of superconductivity
 (A) Very high electric resistance and high thermal conductivity.
 (B) Nearly zero electric resistance and perfect diamagnetic nature.
 (C) Very low specific heat and high band gap energy.
 (D) Very high specific heat and low electric resistance.
29. At very high frequency of alteration of electric field applied on a dielectric medium, the insulating nature is observed if and only if
 (A) electronic polarizability is non-vanishing.
 (B) ionic polarizability vanishes.
 (C) dipolar polarizability vanishes.
 (D) all the three polarizabilities vanish.
30. If the Fermi energy of silver at zero Kelvin is 5eV, the mean energy of electron in silver at this temperature is
 (A) 5 eV (B) 7.5 eV (C) 12 eV (D) 3 eV
31. The wave function of a particle is represented as $\Psi = A e^{i\alpha x}$ for being present in the region $0 < x < L$. The value of normalization constant A is
 (A) $\sqrt{\frac{2}{L}}$ (B) $\sqrt{\frac{1}{L}}$ (C) $\frac{2}{L}$ (D) $\frac{1}{L}$
32. The FTIR spectrometer is based on the principle of
 (A) Fabry - Parot interferometer (B) Michelson interferometer
 (C) X-ray Diffractometer (D) Electron microscope
33. The entropy change accompanying the heating of one mole of helium ($C_v = 3/2R$) from a temperature of 100K to 300K at constant pressure is
 (A) 25.17 J/K mol (B) -13.17 J/K mol (C) 22.83 J/K mol (D) 13.17 J/K mol
34. When electromagnetic wave propagates through a dielectric medium, then
 (A) Electric and magnetic fields oscillate in phase at same frequency.
 (B) Electric and magnetic fields oscillate in phase but not with same frequency.

- (C) Magnetic field oscillates with a phase lag relative to electric field.
 (D) Electric field oscillates with a phase lag relative to magnetic field.
35. A photon of 45 pico-meter wavelength undergoes scattering by loosely bound electron nearly at rest. The maximum wavelength of the scattered photon will be
 (A) 40 pico-meter (B) 74 pico-meter
 (C) 48 pico-meter (D) 24 pico-meter
36. Which of the following techniques is used for multilayer deposition, when very high precision and purity is desired:
 (A) Thermal evaporation (B) Molecular beam epitaxy
 (C) Sputtering (D) Electron beam evaporation
37. The diffusion coefficient does not depend upon
 (A) Temperature of crystal. (B) Combination of solute and solvent.
 (C) Crystal structure of solvent medium. (D) Size of the solvent atom.
38. For the Van der Waal's force, the dependence of the interaction energy on distance r is proportional to
 (A) $\sim r^{-6}$ (B) $\sim r^{-7}$ (C) $\sim r^{-3}$ (D) $\sim r^2$
39. A muon (μ^-) from cosmic rays is trapped by a proton to form a hydrogen-like atom. Given that a muon is approximately 200 times heavier than an electron, the longest wave length of the spectral line (in the analogue of the Lyman series) of such an atom will be
 (A) 0.562 nm (B) 0.667 nm (C) 0.375 nm (D) 1.33 nm
40. A particle of mass m is in trapped in a infinitely cubical box of size a . The potential inside the box ($0 \leq x < a, 0 \leq y < a, 0 \leq z < a$) is zero and infinite outside. If the particle is in an eigenstate of energy $E = \frac{14\pi^2 \hbar^2}{2ma^2}$, its wave function is expressed as:
 (A) $\psi = \left(\frac{2}{a}\right)^{3/2} \sin \frac{3\pi x}{a} \sin \frac{5\pi y}{a} \sin \frac{6\pi z}{a}$ (B) $\psi = \left(\frac{2}{a}\right)^{3/2} \sin \frac{7\pi x}{a} \sin \frac{4\pi y}{a} \sin \frac{3\pi z}{a}$
 (C) $\psi = \left(\frac{2}{a}\right)^{3/2} \sin \frac{4\pi x}{a} \sin \frac{8\pi y}{a} \sin \frac{2\pi z}{a}$ (D) $\psi = \left(\frac{2}{a}\right)^{3/2} \sin \frac{\pi x}{a} \sin \frac{2\pi y}{a} \sin \frac{3\pi z}{a}$
41. Four charges (two $+q$ and other two $-q$) are placed at four vertices of a square of side a . At a point P distant R from the centre ($R \gg a$), the net electrostatic potential is:
 (A) $1/R$ (B) $1/R^2$ (C) $1/R^3$ (D) 0
42. The spin-parity of the ground state of ${}^{64}_{30}\text{Zn}$ nucleus is
 (A) 1^+ (B) 0^+ (C) 0^- (D) 2^-
43. The possible values of the total angular momentum quantum number J under LS coupling of two atomic electrons, whose orbital quantum numbers are $l_1 = 1$ and $l_2 = 2$, are given to be:
 (A) 1,2,3 (B) 0,1,2,3,4 (C) 0,1,2,3 (D) 1,3,2
44. A beam of electrons ($q = -1.6 \times 10^{-19}$ C) moves at 3.0×10^5 m/s through a uniform magnetic field with magnitude 2.0 T. The field is directed towards the negative Z -direction. The velocity of electrons lies in the XZ plane at an angle of 30° to the $+Z$ axis. The force acting on the electron is given in magnitude and direction as:

- (A) 9.6×10^{-14} in positive X-direction (B) 9.6×10^{-14} in negative Z-direction
 (C) 4.8×10^{-14} N in positive Y-direction (D) 4.8×10^{-14} N in negative Y-direction
45. Two atoms A and B exert attractive and repulsive forces on each other such that the potential energy $U(r)$ is represented by $U(r) = -\frac{A}{r^M} + \frac{B}{r^N}$; ($A > 0$, $B > 0$). Then the equilibrium spacing is expressed as:
- (A) $\left(\frac{B}{A}\right)^{(N-M)}$ (B) $\left[\left(\frac{B}{A}\right)\left(\frac{N}{M}\right)\right]^{1/(N-M)}$ (C) $\left(\frac{A}{B}\right)^{1/(N-M)}$ (D) $\left(\frac{A}{B}\right)^{(N-M)}$
46. The ${}_{92}\text{U}^{238}$ transforms to ${}_{85}\text{At}^{210}$ by a series of alpha and negative beta decays. The number of alpha and beta decays, undergone in this transformation, are
- (A) 5 and 7 respectively (B) 2 and 9 respectively
 (C) 7 each (D) 3 and 5 respectively
47. A signal of frequency 10kHz is being digitized by Analog to Digital Converter. A possible sampling time which can be used is:
- (A) 100 μs (B) 40 μs (C) 60 μs (D) 200 μs
48. The ratio of intensities of the D1 and D2 lines of sodium at high temperature is
- (A) 1:1 (B) 2:3 (C) 1:3 (D) 1:2
49. The acceleration due to gravity g on the surface of Earth is approximately 2.6 times that on the surface of Mars. Given that radius of Mars is about one half the radius of Earth, the ratio of the escape velocity on Earth to that on Mars is approximately
- (A) 1.1 (B) 1.3 (C) 2.3 (D) 5.2
50. A beam of pions (π^+) is incident on a proton target, giving rise to the process
- $$\pi^+ + p \rightarrow n + 2\pi^+$$
- Assuming that the decay proceeds through strong interactions, the total isospin I and its third component I_3 for the decay products, are:
- (A) $I=3/2$, $I_3=3/2$ (B) $I=5/2$, $I_3=5/2$ (C) $I=5/2$, $I_3=3/2$ (D) $I=1/2$, $I_3=-1/2$

x-x-x

(ROUGH WORK)

Microbial Biotechnology(Ph.D.)

1. Which of the following is NOT a component of a research proposal?
(A) Literature review (B) Methodology (C) Results (D) Discussion
2. What is the primary purpose of a literature review in research?
(A) To summarize the findings of previous studies
(B) To propose new research ideas
(C) To critique the methods used in previous research
(D) To outline the ethical considerations of the study
3. Which of the following research designs is best suited for studying cause-and-effect relationships?
(A) Descriptive study (B) Correlational study
(C) Experimental study (D) Case study
4. What does a null hypothesis (H_0) state in hypothesis testing?
(A) There is no relationship between variables
(B) There is a significant relationship between variables
(C) The research findings are conclusive
(D) The study is well-designed
5. In a research report, what section typically includes the research questions, objectives, and significance of the study?
(A) Introduction (B) Methodology (C) Results (D) Discussion
6. Which sampling technique involves selecting every n th participant from a list to form a sample?
(A) Stratified sampling (B) Convenience sampling
(C) Systematic sampling (D) Snowball sampling
7. What statistical test is used to determine the association between two categorical variables?
(A) T-test (B) Chi-square test (C) ANOVA (D) Pearson correlation
8. Which of the following is NOT a measure of central tendency?
(A) Mean (B) Median (C) Mode (D) Range
9. What does reliability refer to in research?
(A) The ability of a study to be replicated with consistent results
(B) The accuracy of measurement instruments
(C) The appropriateness of the statistical methods used
(D) The relevance of the study findings
10. What is the purpose of randomization in experimental research?
(A) To ensure all participants have an equal chance of being in either group
(B) To eliminate outliers from the data
(C) To control for confounding variables
(D) To increase the generalizability of findings

11. Which type of validity refers to the extent to which a study measures what it claims to measure?
- (A) Internal validity (B) External validity
(C) Construct validity (D) Content validity
12. What is the primary purpose of ethical guidelines in research?
- (A) To ensure researchers receive proper credit for their work
(B) To protect the rights and welfare of research participants
(C) To provide financial support for research projects
(D) To ensure the study is published in reputable journals
13. Which of the following is NOT a component of APA style referencing?
- (A) In-text citations (B) Footnotes (C) Reference list (D) DOI numbers
14. What is a hypothesis in research?
- (A) A statement of the expected outcome of the study
(B) A summary of previous research findings
(C) A theoretical framework for the study
(D) A list of research questions
15. Which type of research design is characterized by repeated observations over a prolonged period to study changes over time?
- (A) Longitudinal study (B) Cross-sectional study
(C) Case-control study (D) Experimental study
16. Which statistical measure indicates the strength and direction of a linear relationship between two variables?
- (A) Mean (B) Median
(C) Correlation coefficient (D) Standard deviation
17. What is the purpose of peer review in the publication process?
- (A) To reject articles that do not conform to the journal's style
(B) To ensure only senior researchers publish their work
(C) To assess the quality and validity of research before publication
(D) To charge authors for publishing their articles
18. Which of the following is a measure of dispersion?
- (A) Mean (B) Median (C) Range (D) Mode
19. What is the goal of qualitative research?
- (A) To quantify relationships between variables
(B) To generalize findings to a larger population
(C) To explore complex phenomena and understand meanings
(D) To conduct experiments in controlled settings
20. Which type of sampling technique involves dividing the population into distinct groups and then randomly selecting individuals from each group?
- (A) Snowball sampling (B) Convenience sampling
(C) Stratified sampling (D) Quota sampling

21. What is the purpose of a control group in experimental research?
(A) To ensure the study is conducted in a controlled environment
(B) To eliminate confounding variables
(C) To provide a comparison against the experimental group
(D) To increase the generalizability of findings
22. Which type of research design involves collecting data from a group of individuals at a single point in time?
(A) Longitudinal study (B) Cross-sectional study
(C) Experimental study (D) Case-control study
23. What is meant by the term 'sample size' in research?
(A) The size of the population being studied
(B) The number of variables measured in the study
(C) The number of participants or observations in the study
(D) The number of research questions addressed in the study
24. Which of the following is NOT an ethical principle in research involving human participants?
(A) Respect for autonomy (B) Beneficence
(C) Justice (D) Confidentiality
25. What is the purpose of a pilot study in research?
(A) To test the feasibility of the research design and methods
(B) To ensure the study adheres to ethical guidelines
(C) To obtain funding for the main study
(D) To recruit participants for the main study
26. Which group of microorganisms is known for its ability to survive in extreme environmental conditions, such as high temperature, acidity, or salinity?
(A) Archaea (B) Bacteria (C) Fungi (D) Algae
27. Which term describes the continuous culture system where the microbial population is maintained in a steady state by controlling the dilution rate and nutrient supply?
(A) Chemostat (B) Turbidostat (C) Synchronous growth (D) Batch culture
28. The Entner-Doudoroff (ED) pathway is a unique metabolic pathway found in some bacteria. What is the primary function of this pathway?
(A) To synthesize amino acids (B) To oxidize glucose to pyruvate
(C) To fix carbon dioxide (D) To break down fatty acids
29. Which of the following is a key feature of adaptive immunity?
(A) Immediate response (B) Memory response
(C) Non-specific response (D) Physical barrier formation
30. Which of the following cytokines is primarily involved in the promotion of inflammation?
(A) IL-10 (B) IL-4 (C) IL-6 (D) IL-2

31. Which immunological technique is commonly used to detect the presence of specific proteins in a sample by using antibody-antigen interactions?
 (A) Radioimmunoassay (B) ELISA
 (C) Precipitation (D) Agglutination
32. What is the key advantage of using luminescent quantum dots in biological labeling?
 (A) Small size and high surface area
 (B) Low stability and biocompatibility
 (C) Variable fluorescence colors and long-term stability
 (D) Ease of synthesis and cost-effectiveness
33. Which type of gene interaction occurs when the phenotype of a heterozygote is intermediate between the phenotypes of the homozygotes?
 (A) Co-dominance (B) Incomplete dominance
 (C) Pleiotropy (D) Epistasis
34. Which of the following tests is used to determine the mutagenic potential of a chemical by observing the reversion of mutations in bacteria?
 (A) Fluctuation test (B) Replica plating
 (C) Ames test (D) Luria-Delbrück experiment
35. Which type of bond is primarily responsible for the secondary structure of proteins, such as alpha helices and beta sheets?
 (A) Covalent bonds (B) Ionic bonds
 (C) Hydrogen bonds (D) Hydrophobic interactions
36. Which pathway is an alternative to glycolysis and is involved in the production of NADPH and ribose-5-phosphate?
 (A) TCA cycle (B) Gluconeogenesis
 (C) Hexose Monophosphate Pathway (HMP) (D) Beta-oxidation
37. Which complex of the electron transport chain directly transfers electrons to oxygen, forming water?
 (A) Complex I (B) Complex II (C) Complex III (D) Complex IV
38. Which type of enzyme inhibition occurs when an inhibitor binds to an enzyme at a site other than the active site, altering the enzyme's function?
 (A) Competitive inhibition (B) Non-competitive inhibition
 (C) Uncompetitive inhibition (D) Allosteric inhibition
39. Which type of bioreactor is specifically designed for the growth of cells that require attachment to a surface for growth?
 (A) Stirred tank reactor (B) Airlift reactor
 (C) Packed bed reactor (D) Fluidized bed reactor
40. Which chromatography technique separates components based on their differential interactions with a stationary phase and a mobile phase?
 (A) Gas chromatography (GC)
 (B) Paper chromatography

- (C) Thin-layer chromatography (TLC)
 (D) High-performance liquid chromatography (HPLC)
41. Which intracellular bacterium is known for its ability to escape the phagosome and replicate within the cytoplasm of host cells?
 (A) *Salmonella* (B) *Shigella*
 (C) *Listeria monocytogenes* (D) *Rickettsia*
42. Which type of RNA is primarily involved in the splicing of pre-mRNA in eukaryotic cells?
 (A) mRNA (B) tRNA (C) rRNA (D) snRNA
43. Which component is responsible for the addition of amino acids to tRNA molecules during translation?
 (A) Ribosome (B) Aminoacyl-tRNA synthetase
 (C) RNA polymerase (D) Peptidyl transferase
44. Which technique is used for the prediction of genes in prokaryotic genomes?
 (A) PHI-BLAST (B) GeneMark (C) T-Coffee (D) PDBsum
45. Which international treaty primarily deals with the protection of literary and artistic works?
 (A) The Paris Convention (B) The Berne Convention
 (C) The Madrid Agreement (D) The Hague Agreement
46. The Cartagena Protocol on Biosafety primarily addresses:
 (A) The use of human subjects in clinical trials
 (B) The safe handling, transport, and use of genetically modified organisms
 (C) Ethical concerns related to human cloning
 (D) The protection of intellectual property in biotechnology
47. Which technique is commonly used to analyze genetic variability among microbes by comparing DNA fragment patterns?
 (A) Southern blotting
 (B) RFLP (Restriction Fragment Length Polymorphism)
 (C) PCR (Polymerase Chain Reaction)
 (D) Western blotting
48. Metagenomics primarily involves the study of:
 (A) Individual microbial genomes
 (B) Sequencing of entire microbial genomes
 (C) Genomic diversity within a microbial community
 (D) Comparative genomics of pathogens
49. Which strategy focuses on altering the genetic makeup of microbes to enhance production of valuable compounds?
 (A) Structural genomics (B) Classical genetics
 (C) Genome sequencing (D) Metabolic engineering

50. Which phase of clinical trials involves large scale testing of a new drug on a larger group of patients to evaluate its efficacy and safety?

(A) Phase I

(B) Phase II

(C) Phase III

(D) Phase IV

x-x-x

Stem Cell Tissue Engineering and Biomedical Excellence(Ph.D)

1. With respect to intellectual property right in Indian system the term of a Patent granted falls in which one of the following;
(A) For a period of 5 yrs from the date of filling
(B) For a period of 10 yrs from the date of filling
(C) For a period of 20 yrs from the date of filling
(D) For a period of 60 yrs from the date of filling
2. An animal into whose the germ line foreign gene(s) have been engineered is term as;
(A) Outbred animal (B) Inbred animal
(C) Transgenic animal (D) Immuno-compromised animal
3. The proposed surface molecule is assigned a CD number based on which one of the following;
(A) Once Two specific monoclonal antibodies are shown to bind to the molecule
(B) Once Two specific polyclonal antibodies are shown to bind to the molecule
(C) Once one specific monoclonal antibody is shown to bind to the molecule
(D) Once one specific polyclonal antibody is shown to bind to the molecule
4. Changes in the genetic makeup that results in loss of fur and immune-compromised mouse is termed as;
(A) Obese mouse (B) Nude mouse (C) Outbred mouse (D) Wild type mouse
5. A method normally employed for disposing off the animal carcass and other anatomical structures is carried out through which of the following procedure;
(A) Incineration (B) Dumping in open space
(C) Dumping at designated space (D) Chemical treatment
6. For viewing the surface architecture of a particular cell types which of the following methodology would you use;
(A) Transmission Electron Microscopy (B) Scanning Electron microscopy
(C) Atomic field microscopy (D) Phase contrast microscopy
7. While writing thesis results, we give all the following except one of the following;
(A) Raw Data (B) Statistically analyzed data
(C) Tabulated observation comparison (D) Bare and line graphs of the data obtained
8. Which of the following best describe chimera:
(A) An animal composed of cells originating from two or more different embryos
(B) An animal composed of additional appendages due to embryo cleavage
(C) An animal composed of cells originating from skin cells of same individual
(D) An animal composed of cells originating from stromal stem cells
9. Two protein sequences that diverged as a result of gene duplication with in a species will be termed as;
(A) Paralogous (B) Orthologous (C) Analogous (D) Heterologous
10. All the following are the components included in the Materials and Methods, except one of the following;
(A) Name of the supplier of the materials used in thesis
(B) Catalogue number of the product used in experiment
(C) Results observed in the outcome

- (D) Statistical method used for analysis
11. The system of organizing research paper into IMRAD signifies which of the following;
- (A) Introduction, Material & Methods and Results and Discussion
 - (B) Introduction to Market Research and Design
 - (C) Initiating Market Research for Development
 - (D) Introducing methodology for Research & Design
12. In Text writing when you have to cite a reference no. 21 within reference 22 which of the following way is used;
- (A) 21 cited in 22
 - (B) 21-22
 - (C) 21(22)
 - (D) 21 ↔22
13. All the following are important components of the review of literature except, one of the following;
- (A) To understand the definition of the established concepts
 - (B) To understand the gaps existent in the chosen field
 - (C) To provide your research outcome in the proposed research
 - (D) To know the level of theory and research developed in the chosen field
14. For carrying out the research involving human samples, the prior approval of which of the following is mandatory;
- (A) Institutional ethics committee
 - (B) Institutional biohazard committee
 - (C) Institutional translational regulatory committee
 - (D) Institutional research advisory committee
15. The term euthanasia in research refers to which of the following;
- (A) Painful killing
 - (B) Painless killing
 - (C) Survival surgery
 - (D) Surgical intervention
16. The Translational research focuses on which of the following;
- (A) To augment the already existing knowledge
 - (B) To produce meaningful application of the results
 - (C) To publish the significant research results
 - (D) To transfer the research knowledge to next generation
17. For the clinical trial of a new anti-obesity drug, the null hypothesis would state which one of the following;
- (A) The new drug showed no difference in effect in comparison to the current standard treatment.
 - (B) The new drug is very effective in comparison to the current standard treatment.
 - (C) The new drug is less effective in comparison to the current standard treatment.
 - (D) The new drug is partially effective in comparison to the current standard treatment.
18. A commonly used term in bibliography citation or scholarly reference to refer to the source cited in the preceding note or citation is represented by;
- (A) *Ref*
 - (B) *etal*
 - (C) *ibid*
 - (D) *repeat*
19. All the following methods, except, one cannot be used for site specific changes in the gene locus;
- (A) Cre-lox recombinase
 - (B) Random mutagenesis
 - (C) FLP-FRP recombination
 - (D) CRISPER-CAS technology
20. The outcome of an experiment conducted 1st time using two animals each in control and treatment group was found to be completely different from the same experiment repeated twice 2nd & 3rd time

- using eight animals in each group. Statistically which of the following inference would you draw based on the final outcome;
- (A) The experiment conducted for 2nd time is false positive
 (B) The experiment conducted for 1st time is true positive
 (C) The experiment conducted for 2nd time is true positive
 (D) The experiment conducted for 1st time is false negative
21. To avoid the duplication of previous text, the research publication is cross checked by which of the following;
- (A) Source control Software (B) Anti-plagiarism software
 (C) Graphics software (D) Antivirus plus
22. Which one of the following mentioned choices is not a standard format for citing References;
- (A) Harvard system (B) Vancouver system
 (C) CSE Manual system (D) PubMed system
23. The animal cell culture media is important for the growth of cells under *in vitro* condition, all the following are used as Medias except, which one of the following;
- (A) Leibovitz's L-15 (L-15)
 (B) Dulbecco's Modified Eagle Medium (DMEM)
 (C) Luria Broth Medium (LB)
 (D) Roswell Park Memorial Institute- (RPMI-1640)
24. Institutional Committee for Stem Cell Research (IC-SCR) in every institute, in India, involved in stem cell research must be and registered with which of the following national authority for stem cell use and processing;
- (A) National Authority Committed for Stem Cell Research and Training (NAC-SCRT)
 (B) National Apex Committee for Stem Cell Research and Therapy (NAC-SCRT)
 (C) National Advisory Committee for Stem Cell Restoration and Treatment (NAC-SCRT)
 (D) National Apex Committed for Stem Cell Research and Teaching (NAC-SCRT)
25. In a typical compound microscope all of the following statements are true except, one.
- (A) It has two lenses of long focal length
 (B) It has two converging lenses
 (C) It has two lenses of short focal length
 (D) The objective lens forms an inverted image
26. All the following represent stem cell in stricter aspect except which one of the following;
- (A) Inner cell mass (B) Side population cells
 (C) Fertilized oocyte (D) iPSC's
27. The process of generating clones without use of genetic engineering techniques is represented by which one of the following;
- (A) Therapeutic cloning (B) Natural cloning
 (C) Reproductive cloning (D) Gene cloning

28. For embryonic stem cell isolation which of the following methodology is being used;
 (A) Immuno-precipitation (B) Immuno-modulation
 (C) Immuno-surgery (D) Immuno-therapy
29. The limited use of the primary cell is subject to which one of the following;
 (A) Excessive proliferation (B) Hayflick limit
 (C) Critical threshold limit (D) Long synthetic phase of cell cycle
30. During embryonic development the formation of totipotent structure possesses the potential to form complete organism, which one of the following represents such a cell;
 (A) Blastomere structure (B) Inner cell mass (C) Embryoid body (D) Teratoma
31. For studying the DNA synthesis, the incorporation of the following radioactive components are used except, one of the following;
 (A) ^3H deoxycytidine (B) ^3H thymidine
 (C) Bromodeoxyuridine (D) ^{35}S Cystiene
32. For analyzing the cell viability all the following methods are commonly used except one of the following, identify the one which is not used ;
 (A) Mitochondrial potential stain (B) Fluorescent cytoplasmic stain
 (C) Trypan blue stain (D) Coomassie R250 Stain
33. Which of the following cell was used by Yamanaka to generate the Induced pluripotent stem cells?
 (A) Human fibroblast (B) Mouse fibroblast
 (C) Human endothelial cells (D) Mouse endothelial cells
34. Protrusion of membrane lamellopodia during the growth is indicative of which of the following process;
 (A) Cell death (B) Cell migration (C) Cell duplication (D) Cell senescence
35. You isolated a phytochemical, exposure of the mesenchymal cells to this compound resulted in significant reduction in the double time of these cells only. What is the most appropriate character of this phytochemical;
 (A) Cell differentiation nature (B) Cell proliferating nature
 (C) Cell apoptosis (D) Cell senescence
36. The sorting of the side population cell from total Cell population of the bone marrow through flowcytometry is carried out exploiting which of the following stain;
 (A) Green fluorescence Protein (B) Silver stain
 (C) Xylene cyanol blue (D) Hoechst 33342
37. The stem cell niche provides the microenvironment enabling stems cell to have which of the following character;
 (A) To retain stem cell potential
 (B) Allow stem cell to divide and differentiate
 (C) Allow functionally committed cell to dedifferentiate

- (D) Inhibit stem cell division
38. A Dimeric protein having molecular weight of 60 kDa for was electrophoresed on plain polyacrylamide gel electrophoresis (PAGE) and then separately on SDS-PAGE. When the bands were resolved for each of the gel which of the following outcome correctly represent the result;
- (A) One bands of 120 kDa on PAGE and one band of 120 kDa on SDS-PAGE
(B) One band of 120 kDa on PAGE and one band of 60 kDa on SDS-PAGE
(C) One band of 60 kDa on PAGE and two bands of 60 and 120 kDa each on SDS-PAGE
(D) Two bands of 60 and 120 kDa each on PAGE-and SDS-PAGE
39. A DNA molecule with variation in methylation pattern of the genomic DNA could be sequenced through which of the sequencing technology;
- (A) Pyrosequencing (B) Bisulfite sequencing
(C) Maxam-Gilbert sequencing (D) Sanger sequencing
40. In comparison to primates the mouse embryonic stem cells could be discriminated through which of the following marker;
- (A) Stage specific embryonic antigen-4 (B) Stage specific embryonic antigen-1
(C) Oct4/Sox2 (D) Oct3/4 and Nanog
41. Which of the following occurs as a result of mismatched blood transfusion?
- (A) Type I hypersensitivity (B) Type II hypersensitivity
(C) Type III hypersensitivity (D) Type IV hypersensitivity
42. You have isolate a compound "X", the exposure to which significantly improved the tissue repair process, which of the following test would you recommend to analyse this phenomena;
- (A) Wound healing assay (B) MTT Assay
(C) Gel retardation assay (D) DNA fingerprinting assay
43. Which of the following assay would you perform to characterize your stem cell line as soon as you received from commercial supplier;
- (A) Supershift Assay (B) Gel Pull down assay
(C) In situ hybridization assay (D) Short Tandem Repeats
44. For tissue engineering purpose the angiogenesis is an important process that lead to formation of which one of the following;
- (A) Neural extension (B) Blood cell formation
(C) New vessel formation (D) Gap junctions
45. In eukaryotic chromatin assembly a set of Histone proteins are required, which one of the following set is the correct answer;
- (A) H1A, H1B, H2, H3 and H4. (B) H1, H2A, H2B, H3 and H4.
(C) H1, H2, H3A, H3B and H4. (D) H1, H2, H3, H4A and H4B.
46. In microarray hybridisation of probes with labelled samples, which of the following conditions represent the correct set of the information;
- (A) Template sequence, humidity and salt concentration

- (B) Temperature, Template sequence and salt concentration
 - (C) Temperature, humidity and Template sequence
 - (D) Temperature, humidity and salt concentration
47. In Hybridoma which is the right choice of answer for use of HGPRTnegative myeloma cells;
- (A) These cells cannot use Hypoxanthine
 - (B) These cells cannot use Aminopterin
 - (C) These cells are not able to use Thymidine
 - (D) These cells have lost division
48. Which of the following is the richest source of Mesenchymal stem cell?
- (A) Adipose Tissue
 - (B) Wharton Jelly
 - (C) Bone marrow
 - (D) Inner cell mass
49. Cancer Stem cells can be identified by efflux of which of the incorporated dye from the subpopulation of other cell types;
- (A) Hoechst dye
 - (B) Bromophenol blue dye
 - (C) Cyan fluorescence protein
 - (D) Eosine Y
50. Which one of the following methods is used for generating the feeder cultures required for growing embryonic stem cells;
- (A) Treating cells with gentamycin
 - (B) Treating cells with mitomycin
 - (C) Exposing cells to visible light
 - (D) Exposing the cells to gradient of temperature

x-x-x

Home Science(Ph.D.)

1. _____ is applicable to phenomena that can be expressed in terms of quantity.
(A) Qualitative (B) Applied (C) Fundamental (D) Quantitative
2. Refer to the behaviour and instruments used in selecting and constructing research technique.
(A) Evidences (B) Research methods
(C) Communication (D) Logical Reasoning
3. Research process consists of series of actions necessary to effectively carry out research:
i) Review the literature ii) Design research
iii) Define research problem iv) Formulate hypotheses
(A) i) iii) iv) ii) (B) iv) ii) iii) i) (C) i) ii) iii) iv) (D) iii) i) iv) ii)
4. It involves grouping the population and then selecting the groups rather than individual elements for inclusion in the sample.
(A) Cluster sampling (B) Multi-stage sampling
(C) Stratified sampling (D) Sequential sampling
5. The main text of the report should have the following parts:
i) Main report ii) Summary of findings
iii) Conclusion iv) Introduction
(A) i) iii) iv) ii) (B) iv) ii) i) iii) (C) i) ii) iii) iv) (D) iii) i) iv) ii)
6. In social research, it is considered to do some field observation and as such the researcher may undertake some sort of preliminary survey and it is often called:
(A) Statement Survey (B) Census Survey
(C) Literature Survey (D) Pilot Survey
7. _____ design which concerns with the question of how many items are to be observed and how the information and data gathered are to be analysed.
(A) Operational (B) Statistical (C) Both A & B (D) Observational
8. A researcher must discuss his problem with his colleagues and others who have enough experience in the same area are often known as:
(A) Data Survey (B) Focused Survey
(C) Experience Survey (D) General Survey
9. A research design must contain:
i) a clear statement of the research problem
ii) procedures and techniques to be used for gathering information
iii) the population to be studied
iv) methods to be used in processing and analysing data
(A) i) ii) (B) i) ii) iii) (C) i) iv) (D) i) ii) iii) iv)
10. Following is/are independent variables:
(A) Readymade Films (B) Lectures
(C) Both A & B (D) Behavioural Changes

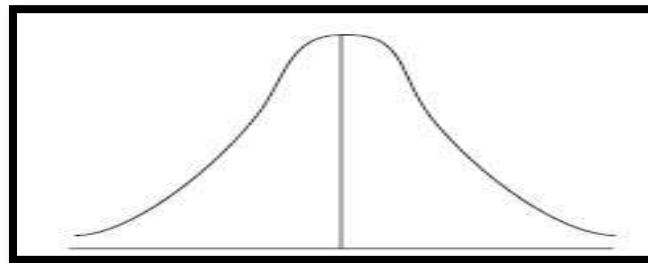
11. Experimental designs are associated with:
 (A) P C Mahalanobis (B) Carl Friedrich Gauss
 (C) Quetelet Adolphe (D) R.A. Fisher
12. According to the Principle of Replication, the experiment should be repeated more than:
 (A) Twice (B) Thrice (C) Both A & B (D) Once
13. A sample design is a _____ plan for obtaining a sample from a given population.
 (A) Definite (B) Indefinite (C) Infinite (D) Random
14. _____ are the random variations in the sample estimates around the true population parameters.
 (A) Normal Errors (B) Sampling Errors
 (C) Infinite Errors (D) None of these
15. Probability sampling is also known as:
 (A) Random Sampling (B) Chance Sampling
 (C) Both A & B (D) Quota Sampling
16. Most widely used classification of measurement scales are:
 i) nominal scale ii) ordinal scale iii) interval scale iv) ratio scale
 (A) i) ii) (B) iii) iv) (C) i) iii) iv) (D) All of these
17. When we judge an object in absolute terms against some specified criteria which scale do we use:
 (A) Rating (B) Differential (C) Observational (D) Summated
18. The _____ are those which are collected afresh and thus happen to be original in character.
 (A) Secondary Data (B) Primary Data
 (C) Tertiary Data (D) Only A & B
19. The basic principle of _____ is to test for differences among the means of the populations by examining the amount of variation within each of these samples, relative to the amount of variation between the samples.
 (A) Standard Deviation (B) ANOVA
 (C) Mean (D) Correlation
20. The main demerit of data collected through questionnaires is:
 (A) Free from the bias
 (B) Respondents have adequate time to fill
 (C) Low rate of return of the duly filled
 (D) Large samples can be made
21. _____ refers to the process of assigning numerals to answers so that responses can be put into a limited number of categories or classes.
 (A) Classification (B) Coding (C) Categorization (D) Grouping

22. Measures of _____ tendency tell us the point about which items have a tendency to cluster.
 (A) Before (B) Central (C) Front (D) None of these

23. It is the most common measure of:

$$\bar{X} = \frac{\sum X_i}{n} = \frac{X_1 + X_2 + \dots + X_n}{n}$$

- (A) Mean (B) Median (C) Mode (D) Dispersion
24. _____ is most widely used measure of dispersion of a series and is commonly denoted by the symbol 'σ'.
 (A) Mean Deviation (B) Range (C) Standard Deviation (D) Probability
25. Following curve depicts:



$$(\bar{x} = M = Z)$$

- (A) No Skewness (B) Positive Skewness
 (C) Negative Skewness (D) None of these
26. Which element of art used in home management:
 (A) Pattern (B) Harmony (C) Balance (D) Rhythm
27. It shows the dullness or brightness of a color.
 (A) Shade (B) Hue (C) Chroma (D) Value
28. It is a conscious seeking of the simplest, easiest and quickest way of carrying out any work.
 (A) Work Modification (B) Work Efficiency
 (C) Work Management (D) Work Simplification
29. This is a style of flower arrangement in which flat flower vases are used is called:
 (A) Ikebana (B) Moribana (C) Seika (D) Mass Arrangement
30. The person is called Grade III obese when BMI is:
 (A) >40 (B) 30-40 (C) 25-29.9 (D) <25
31. _____ is the main carrier of cholesterol:
 (A) LDL (B) VLDL (C) HDL (D) Chylomicrons
32. _____ diet is a diet which is mechanically, chemically and thermally non-irritating.
 (A) Solid (B) Bland (C) Liquid (D) Semi-solid

33. Excessive hunger as glucose lost in urine and tissue in diabetics called:
 (A) Polyphagia (B) Polydipsia (C) Polyuria (D) Glycosuria
34. Restricted protein, high carbohydrate, restricted salt, moderate fat with restricted fluid are recommended for:
 (A) Liver Patient (B) Diabetics (C) Nephrotic Patient (D) Heart Patient
35. An insufficiency of iron for the formation of Hb, the RBC is small and the anemia is said to be:
 (A) Normocytic (B) Macrocytic (C) Megaloblastic (D) Microcytic
36. At what age babbling vocal sounds become quite common. This appears when child sees something or hears some sounds.
 (A) 3 months (B) 6 months (C) 4 months (D) 2 months
37. _____ emphasizes that how parents manage their child's sexual and aggressive drive in the first few years in crucial for healthy personality development.
 (A) Psychosexual Theory (B) Psychosocial Theory
 (C) Psychophysical Theory (D) None of these
38. Intimacy versus isolation:
 (A) Adolescence (B) Young adulthood (C) 6-11 years (D) None
39. Children's reasoning becomes logical and better organized:
 (A) Sensorimotor (B) Pre Operational
 (C) Formal Operational (D) Concrete Operational
40. The field of child development:
 (A) is devoted to understanding human constancy and change throughout the lifespan
 (B) is part of a larger, interdisciplinary field known as developmental science
 (C) focuses primarily on children's physical and emotional development
 (D) focuses primarily on infants' and children's social and cognitive development
41. _____ is the separation of fibers from the seeds.
 (A) Ginning (B) Spinning (C) Harvesting (D) Picking
42. Wool from 12 to 14 month old sheep for the first time is known as:
 (A) Pulled Wool (B) Dead Wool (C) Hogget Wool (D) Lamb Wool
43. _____ dyes are extracted from the roots, stems, leaves, flowers and fruits of various plants and dried bodies of certain insects and minerals.
 (A) Synthetic (B) Manmade (C) Both A & B (D) Natural
44. _____ was the first synthetic fiber.
 (A) Rayon (B) Nylon (C) Acetate (D) Polyester
45. Spun yarns are numbered in terms of length per unit area and the system is called:
 (A) Tex (B) Denier (C) Count (D) None of these
46. General Communication Model:
 i) Message ii) Treatment iii) Receiver iv) Channel v) Sender

Punjabi(Ph.D.)

- 1 ਆਧੁਨਿਕ ਭਾਸ਼ਾ ਵਿਗਿਆਨ ਅਨੁਸਾਰ ਭਾਸ਼ਾ ਹੈ:
 - (A) ਸੰਚਾਰ ਦਾ ਸਾਧਨ
 - (B) ਸਮਾਜਿਕ ਵਰਤਾਰਾ
 - (C) ਖੁਦਮੁਖਤਾਰ ਵਰਤਾਰਾ
 - (D) ਮਨੁੱਖੀ ਹਸਤੀ ਦੀ ਪਹਿਚਾਣ

- 2 ਨਿਉਰੋ-ਭਾਸ਼ਾ ਵਿਗਿਆਨ ਨਾਲ ਸੰਬੰਧਤ ਭਾਸ਼ਾ ਵਿਗਿਆਨੀ ਹੈ:
 - (A) ਸੋਸਿਊਰ
 - (B) ਲੋਨੋਬਰਗ
 - (C) ਬਲੂਮਫੀਲਡ
 - (D) ਲੇਹਮੈਨ

- 3 ਪੁਸਤਕ 'ਮਾਨਵੀਕੀ ਭਾਸ਼ਾ ਵਿਗਿਆਨ' ਦਾ ਲੇਖਕ ਹੈ:
 - (A) ਡਾ.ਪਰਮਜੀਤ ਸਿੰਘ ਸਿੱਧੂ
 - (B) ਡਾ.ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼ ਸਿੰਘ
 - (C) ਡਾ. ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ
 - (D) ਡਾ. ਸੁਖਵਿੰਦਰ ਸਿੰਘ ਸੰਘਾ

- 4 ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ ਦੀ ਕ੍ਰਮ ਵਿਉਂਤ ਹੈ:
 - (A) ਕਰਤਾ, ਕਰਮ, ਕਿਰਿਆ
 - (B) ਕਰਤਾ, ਕਿਰਿਆ, ਕਰਮ
 - (C) ਕਰਮ, ਕਰਤਾ, ਕਿਰਿਆ
 - (D) ਕਰਤਾ, ਸਹਾਇਕ ਕਿਰਿਆ, ਕਰਮ

- 5 ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀਆਂ ਦੰਤੀ ਧੁਨੀਆਂ ਕਿਹੜੀਆਂ ਹਨ:
 - (A) ਕ, ਖ, ਗ
 - (B) ਚ, ਛ, ਜ
 - (C) ਤ, ਥ, ਦ
 - (D) ਪ, ਫ, ਬ

- 6 ਗੁਰਮੁਖੀ ਲਿਪੀ ਵਿੱਚ ਸਵਰ ਵਾਹਕਾਂ ਦੀ ਗਿਣਤੀ ਹੈ:
 - (A) ਤਿੰਨ
 - (B) ਚਾਰ
 - (C) ਛੇ
 - (D) ਦਸ

7 ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ ਵਿੱਚ ਲਿਪੀ-ਚਿੰਨ੍ਹਾਂ ਦੀ ਗਿਣਤੀ ਹੈ ;

- (A) 35
- (B) 41
- (C) 52
- (D) 45

8 ਨਾਂਵ-ਵਾਕੰਸ਼ ਕੀ ਹੈ;

- (A) ਵਿਆਕਰਨਿਕ ਇਕਾਈ
- (B) ਵਿਆਕਰਨਿਕ ਸ਼੍ਰੇਣੀ
- (C) ਸ਼ਬਦ-ਜੁੱਟ
- (D) ਵਾਕ ਵਿਉਂਤ

9 ਪ੍ਰਿਸੀਪਲ ਤੇਜਾ ਸਿੰਘ ਅਨੁਸਾਰ ਪੰਜਾਬੀ ਸਾਹਿੱਤ ਦਾ ਮੁੱਢ ਕਿਸ ਨਾਲ ਬੱਝਾ;

- (A) ਸੂਫ਼ੀ ਸਾਹਿੱਤ
- (B) ਨਾਥਾਂ ਯੋਗੀਆਂ ਦਾ ਸਾਹਿੱਤ
- (C) ਵਾਰ ਸਾਹਿੱਤ
- (D) ਕਿੱਸਾ ਸਾਹਿੱਤ

10 ਸ੍ਰੀ ਗੁਰੂ ਗਰੰਥ ਸਾਹਿਬ ਵਿੱਚ ਜੈਜੈਵੰਤੀ ਰਾਗ ਦੀ ਵਰਤੋਂ ਕਿਸ ਬਾਣੀਕਾਰ ਨੇ ਕੀਤੀ::

- (A) ਗੁਰੂ ਤੇਗ਼ ਬਹਾਦਰ
- (B) ਗੁਰੂ ਨਾਨਕ ਦੇਵ
- (C) ਭਗਤ ਕਬੀਰ
- (D) ਗੁਰੂ ਅਰਜਨ ਦੇਵ

11 ਭਾਈ ਨਜ਼ਾਬਤ ਨੇ ਕਿਹੜੇ ਰੂਪਕਾਰ ਵਿੱਚ ਰਚਨਾ ਕੀਤੀ ;

- (A) ਬਾਰੂਮਾਹਾ
- (B) ਵਾਰ
- (C) ਸਾਖੀ
- (D) ਕਿੱਸਾ

12 ਸ੍ਰੀ ਗੁਰੂ ਗ੍ਰੰਥ ਸਾਹਿਬ ਵਿੱਚ ਕਿਨ੍ਹੇ ਬਾਣੀਕਾਰਾਂ ਦੀ ਬਾਣੀ ਦਰਜ ਹੈ;

- (A) 36
- (B) 31
- (C) 25
- (D) 30

13 ਸ੍ਰੀ ਗੁਰੂ ਗ੍ਰੰਥ ਸਾਹਿਬ ਵਿਚਲੇ ਬਾਣੀਕਾਰਾਂ ਵਿੱਚੋਂ ਕਿਹੜੇ ਭਗਤ ਨੇ ਇੱਕੋ ਵੇਲੇ ਸਰਗੁਣ ਤੇ ਨਿਰਗੁਣ ਭਗਤੀ ਨੂੰ ਆਪਣੀ ਬਾਣੀ ਦਾ ਆਧਾਰ ਬਣਾਇਆ;

- (A) ਜੈ ਦੇਵ
- (B) ਕਬੀਰ
- (C) ਰਵੀਦਾਸ
- (D) ਸ਼ੇਖ ਫਰੀਦ

14 ਸੂਫੀ ਮੱਤ ਦੇ ਕੇਂਦਰੀ ਤੱਤ ਹੈ;

- (A) ਮੁਰਸ਼ਦ ਤੇ ਸ਼ਰੀਅਤ
- (B) ਮੁਰਸ਼ਦ ਤੇ ਇਸ਼ਕ
- (C) ਸਿਲਸਿਲਾ ਤੇ ਹੱਜ
- (D) ਮਸੀਤ ਤੇ ਤੀਰਥ ਯਾਤਰਾ

15 ਕਿੱਸਾ ਕਾਵਿ-ਧਾਰਾ ਨਾਲ ਸੰਬੰਧਤ ਕਵੀ ਹਨ;

- (A) ਕਾਦਰਯਾਰ, ਹਾਸ਼ਮ ਸ਼ਾਹ, ਸ਼ੇਖ ਫਰੀਦ
- (B) ਅਹਿਮਦ ਗੁੱਜਰ, ਅਹਿਮਦਯਾਰ, ਸ਼ਾਹ ਹੁਸੈਨ
- (C) ਵਾਰਿਸ ਸ਼ਾਹ, ਹਾਸ਼ਮ ਸ਼ਾਹ, ਪੀਲੂ
- (D) ਦਮੋਦਰ, ਮੁਕਬਲ, ਨਜ਼ਾਬਤ

16 ਪੰਜਾਬੀ ਵਾਰ ਕਾਵਿ ਨਾਲ ਸੰਬੰਧਤ ਕਵੀ ਹਨ;

- (A) ਸੁਲਤਾਨ ਬਾਹੂ, ਗੁਰੂ ਤੇਗ ਬਹਾਦਰ, ਭਾਈ ਗੁਰਦਾਸ
- (B) ਗੁਰੂ ਨਾਨਕ ਦੇਵ, ਗੁਰੂ ਗੋਬਿੰਦ ਸਿੰਘ, ਭਾਈ ਗੁਰਦਾਸ
- (C) ਨਜ਼ਾਬਤ, ਗੁਰੂ ਗੋਬਿੰਦ ਸਿੰਘ, ਫ਼ਜ਼ਲ ਸ਼ਾਹ
- (D) ਪੀਲੂ, ਮੁਕਬਲ, ਭਾਈ ਗੁਰਦਾਸ

17 ਪੰਜਾਬੀ ਸੂਫੀ ਕਾਵਿ ਨਾਲ ਸੰਬੰਧਤ ਕਵੀ ਹਨ;

- (A) ਸ਼ੇਖ ਫਰੀਦ, ਸ਼ਾਹ ਹੁਸੈਨ, ਸੁਲਤਾਨ ਬਾਹੂ
- (B) ਸ਼ੇਖ ਫਰੀਦ, ਖਵਾਜਾ ਗੁਲਾਮ ਫਰੀਦ, ਵਾਰਿਸ ਸ਼ਾਹ
- (C) ਅਹਿਮਦ ਗੁੱਜਰ, ਹਾਸ਼ਮ ਸ਼ਾਹ, ਬੁਲ੍ਹੇ ਸ਼ਾਹ
- (D) ਦਮੋਦਰ, ਮੁਕਬਲ, ਬੁਲ੍ਹੇ ਸ਼ਾਹ

- 18 ਸ੍ਰੀ ਗੁਰੂ ਗ੍ਰੰਥ ਸਾਹਿਬ ਵਿੱਚ ਕਿੰਨੇ ਰਾਗਾਂ ਵਿੱਚ ਬਾਣੀ ਦਰਜ ਹੈ;
- (A) ਦਸ
(B) ਗਿਆਰਾਂ
(C) ਇੱਕੱਤੀ
(D) ਅੱਠ
- 19 ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਨਾਵਲ ਦਾ ਪਿਤਾਮਾ ਹੈ;
- (A) ਨੌਰਾ ਰਿਚਰਡਜ਼
(B) ਭਾਈ ਵੀਰ ਸਿੰਘ
(C) ਲਾਲਾ ਕਿਰਪਾ ਸਾਗਰ
(D) ਨਾਨਕ ਸਿੰਘ
- 20 ਵਿਅਕਤੀਵਾਦੀ ਆਦਰਸ਼ਵਾਦੀ ਧਾਰਾ ਨਾਲ ਸੰਬੰਧਤ ਵਾਰਤਕਕਾਰ ਹੈ;
- (A) ਗੁਰਬਖਸ਼ ਸਿੰਘ ਪ੍ਰੀਤਲੜੀ
(B) ਬਲਵੰਤ ਗਾਰਗੀ
(C) ਬਲਰਾਜ ਸਾਹਨੀ
(D) ਪ੍ਰਿੰਸੀਪਲ ਤੇਜਾ ਸਿੰਘ
- 21 ਪੰਜਾਬੀ ਨਾਵਲ ਦੇ ਖੇਤਰ ਵਿੱਚ ਗਿਆਨਪੀਠ ਸਨਮਾਨ ਨਾਲ ਸਨਮਾਨਿਤ ਨਾਵਲਕਾਰ ਹੈ;
- (A) ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ
(B) ਗੁਰਦਿਆਲ ਸਿੰਘ
(C) ਸੋਹਣ ਸਿੰਘ ਸੀਤਲ
(D) ਦਰਸ਼ਨ ਸਿੰਘ ਧਰਿ
- 22 ਲੋਕਧਾਰਾ ਤੇ ਲੋਕਯਾਨ ਹਨ;
- (A) ਸਮਾਨਆਰਥੀ
(B) ਵਿਰੋਧਆਰਥੀ
(C) ਭਿੰਨ ਭਿੰਨ ਸੰਕਲਪ
(D) ਭਿੰਨ ਭਿੰਨ ਵਿਸ਼ੈ-ਖੇਤਰ
- 23 'ਸਟਕਚਰਲ ਐਂਥਰੋਪੋਲੋਜੀ' ਪੁਸਤਕ ਦਾ ਲੇਖਕ ਹੈ;
- (A) ਰੋਲਾਂ ਬਾਰਤ
(B) ਵਲਾਦੀਮੀਰ ਪ੍ਰਾਪ
(C) ਕਲਾਦ ਲੈਵੀਸਤਰਾਸ
(D) ਐਲਨ ਟੇਟ

24 'ਲੋਕਧਾਰਾ ਅਤੇ ਮੱਧਕਾਲੀਨ ਪੰਜਾਬੀ ਸਾਹਿਤ' ਪੁਸਤਕ ਦਾ ਲੇਖਕ ਹੈ;

- (A) ਡਾ. ਕਰਨੈਲ ਸਿੰਘ ਬਿੰਦ
- (B) ਡਾ. ਨਾਹਰ ਸਿੰਘ
- (C) ਡਾ. ਗੁਰਬਖਸ਼ ਸਿੰਘ ਫ਼ਰੈਂਕ
- (D) ਡਾ. ਭੁਪਿੰਦਰ ਸਿੰਘ ਖਹਿਰਾ

25 ਹੇਠ ਲਿਖਿਆਂ ਵਿੱਚੋਂ ਲੋਕ-ਸਾਜ਼ਾਂ ਦਾ ਸਹੀ ਜੁੱਟ ਹੈ;

- (A) ਹਰਮੋਨੀਅਮ ਤੇ ਇੱਕ-ਤਾਰਾ
- (B) ਢੋਲ ਅਤੇ ਸਿਤਾਰ
- (C) ਢੋਲਕੀ ਅਤੇ ਬੁਗਤੂ
- (D) ਵੰਝਲੀ ਅਤੇ ਤਬਲਾ

26 ਪਰਵਾਸੀ ਪੰਜਾਬੀ ਨਾਵਲਕਾਰ ਦਾ ਸਹੀ ਜੁੱਟ ਹੈ;

- (A) ਦਰਸ਼ਨ ਸਿੰਘ ਧੀਰ ਅਤੇ ਦਰਸ਼ਨ ਸਿੰਘ ਗਿੱਲ
- (B) ਹਰਜੀਤ ਅਟਵਾਲ ਅਤੇ ਪ੍ਰੋ. ਹਰਭਜਨ ਸਿੰਘ
- (C) ਡਾ. ਮਹਿੰਦਰ ਗਿੱਲ ਅਤੇ ਹਰਪ੍ਰੀਤ ਸੇਖਾ
- (D) ਸਵਰਨ ਚੰਦਨ ਅਤੇ ਮੰਗਾ ਸਿੰਘ ਬਾਸੀ

27 ਕਨੇਡਾ ਦੇ ਪੰਜਾਬੀ ਕਵੀਆਂ ਦਾ ਸਹੀ ਜੁੱਟ ਹੈ;

- (A) ਅਜਮੇਰ ਕਵੈਂਟਰੀ ਅਤੇ ਇਕਬਾਲ ਰਾਮੂਵਾਲੀਆ
- (B) ਨਿਰੰਜਣ ਸਿੰਘ ਨੂਰ ਅਤੇ ਮਹਿੰਦਰ ਗਿੱਲ
- (C) ਦਰਸ਼ਨ ਗਿੱਲ ਅਤੇ ਮੰਗਾ ਸਿੰਘ ਬਾਸੀ
- (D) ਦਰਸ਼ਨ ਗਿੱਲ ਅਤੇ ਜਸਵਿੰਦਰ ਮਾਨ

28 ਨਾਵਲ 'ਰੇਤ' ਦਾ ਲੇਖਕ ਹੈ:

- (A) ਹਰਜੀਤ ਅਟਵਾਲ
- (B) ਦਰਸ਼ਨ ਸਿੰਘ ਧੀਰ
- (C) ਸਵਰਨ ਚੰਦਨ
- (D) ਨਦੀਮ ਪਰਮਾਰ

29 ਉੱਤਰੀ ਅਮਰੀਕਾ ਦੇ ਪੰਜਾਬੀ ਕਹਾਣੀਕਾਰਾਂ ਦਾ ਸਹੀ ਜੁੱਟ ਹੈ;

- (A) ਮਹਿੰਦਰ ਗਿੱਲ ਅਤੇ ਪਰਵੇਜ਼ ਸੰਧੂ
- (B) ਜਰਨੈਲ ਸਿੰਘ ਅਤੇ ਪ੍ਰੋ. ਹਰਭਜਨ ਸਿੰਘ
- (C) ਹਰਪ੍ਰੀਤ ਸੇਖਾ ਅਤੇ ਹਰਜੀਤ ਅਟਵਾਲ
- (D) ਰਘਬੀਰ ਢੰਡ ਅਤੇ ਸੁਰਿੰਦਰ ਸੋਹਲ

30 ਪਾਕਿਸਤਾਨੀ ਪੰਜਾਬੀ ਸਾਹਿਤ ਦੇ ਪ੍ਰਮੁੱਖ ਕਵੀਆਂ ਦਾ ਸਹੀ ਜੁੱਟ ਹੈ;

- (A) ਫ਼ਖ਼ਰ ਜਮ੍ਹਾਂ ਅਤੇ ਮਕਸੂਦ ਸਾਕਿਬ
- (B) ਬਾਬਾ ਨਜ਼ਮੀ ਅਤੇ ਉਸਤਾਦ ਦਾਮਨ
- (C) ਅਹਿਸਾਨ ਬਾਜਵਾ ਅਤੇ ਨਜ਼ਮ ਹੁਸੈਨ ਸੱਯਦ
- (D) ਅਕਰਮ ਸ਼ੇਖ ਅਤੇ ਖ਼ਾਲਿਦ ਧਾਲੀਵਾਲ

31 'ਸੋਧਾਂ ਤੇ ਸਾਰਾਂ' ਪੁਸਤਕਾਂ ਦਾ ਲੇਖਕ ਹੈ:

- (A) ਨਜ਼ਮ ਹੁਸੈਨ ਸੱਯਦ
- (B) ਅਨਲ ਹੱਕ ਫ਼ਰੀਦਕੋਟੀ
- (C) ਸ਼ਾਹੀਨ ਮਲਿਕ
- (D) ਅਫ਼ਜ਼ਲ ਅਹਿਸਨ ਰੰਧਾਵਾ

32 ਪਾਕਿਸਤਾਨੀ ਪੰਜਾਬੀ ਕਹਾਣੀਕਾਰਾਂ ਦਾ ਸਹੀ ਜੁੱਟ ਹੈ;

- (A) ਅਹਿਮਦ ਸਲੀਮ ਗਿੰਮੀ ਅਤੇ ਉਸਤਾਦ ਦਾਮਨ
- (B) ਅਫ਼ਜ਼ਲ ਅਹਿਸਨ ਰੰਧਾਵਾ ਅਤੇ ਮਕਸੂਦ ਸਾਕਿਬ
- (C) ਖ਼ਾਲਿਦ ਫਰਹਾਦ ਧਾਲੀਵਾਲ ਅਤੇ ਅਹਿਸਾਨ ਬਟਾਲਵੀ
- (D) ਖ਼ਾਲਿਦ ਹੁਸੈਨ ਅਤੇ ਰਜੀਆ ਨੂਰ ਮਹੰਮਦ

33 ਪੁਸਤਕ 'ਧਵਨਯਲੋਕ' ਦਾ ਕਰਤਾ ਹੈ;

- (A) ਵਾਮਨ
- (B) ਕਸ਼ਮੇਂਦਰ
- (C) ਆਨੰਦਵਰਧਨ
- (D) ਭਰਤਮੁਨੀ

34 'ਸਧਾਰਣੀਕਰਨ' ਦਾ ਸੰਕਲਪ ਕਿਸ ਸੰਪਰਦਾਇ ਨਾਲ ਸੰਬੰਧਤ ਹੈ;

- (A) ਧੂਨੀ ਸੰਪਰਦਾਇ
- (B) ਅਲੰਕਾਰ ਸੰਪਰਦਾਇ
- (C) ਰੀਤੀ ਸੰਪਰਦਾਇ
- (D) ਰਸ ਸੰਪਰਦਾਇ

35 'Image Music Text' ਪੁਸਤਕ ਦਾ ਕਰਤਾ ਹੈ;

- (A) ਰੋਲਾਂ ਬਾਰਤ
- (B) ਜੇਨਾਰਡ ਜੈਨੇ
- (C) ਰਾਬਰਟ ਸ਼ੋਲਜ਼
- (D) ਜਾਰਜ ਪ੍ਰਿੰਸ

36 'ਅੰਤਰਪਾਠਾਤਮਕਤਾ' ਦਾ ਸੰਕਲਪ ਕਿਸ ਸਿਧਾਂਤਕਾਰ ਨਾਲ ਸੰਬੰਧਤ ਹੈ;

- (A) ਮਿਸ਼ੇਲ ਫੂਕੋ
- (B) ਯੱਕ ਦੇਰੀਦਾ
- (C) ਲੂਸੀਅਨ ਗੋਲਡਮਾਨ
- (D) ਜੂਲੀਆ ਕ੍ਰਿਸਤਿਵਾ

37 'ਸਾਹਿਤ ਸੰਵੇਦਨਾ' ਪੁਸਤਕ ਦਾ ਲੇਖਕ ਹੈ;

- (A) ਸੰਤ ਸਿੰਘ ਸੇਖੋਂ
- (B) ਪ੍ਰੋ. ਕਿਸ਼ਨ ਸਿੰਘ
- (C) ਡਾ. ਅਤਰ ਸਿੰਘ
- (D) ਡਾ. ਰਵਿੰਦਰ ਸਿੰਘ ਰਵੀ

38 ਪੰਜਾਬੀ ਦੇ ਰੂਪਵਾਦੀ-ਸੰਨਰਚਨਾਵਾਦੀ ਆਲੋਚਕਾਂ ਦਾ ਸਹੀ ਜੁੱਟ ਹੈ;

- (A) ਡਾ. ਹਰਿਭਜਨ ਸਿੰਘ ਤੇ ਡਾ. ਰਵਿੰਦਰ ਸਿੰਘ ਰਵੀ
- (B) ਡਾ. ਹਰਿਭਜਨ ਸਿੰਘ ਤੇ ਡਾ. ਤਰਲੋਕ ਸਿੰਘ ਕੰਵਰ
- (C) ਡਾ. ਜਸਵਿੰਦਰ ਸਿੰਘ ਤੇ ਡਾ. ਤੇਜਵੰਤ ਸਿੰਘ ਗਿੱਲ
- (D) ਡਾ. ਜਗਬੀਰ ਸਿੰਘ ਤੇ ਪ੍ਰੋ. ਕਿਸ਼ਨ ਸਿੰਘ

39 ਪੰਜਾਬੀ ਕਹਾਣੀ ਦੀ ਆਲੋਚਨਾ ਨਾਲ ਸੰਬੰਧਤ ਵਿਦਵਾਨ ਹਨ;

- (A) ਡਾ. ਟੀ ਆਰ ਵਿਨੋਦ ਤੇ ਡਾ. ਨਾਹਰ ਸਿੰਘ
- (B) ਡਾ. ਸੁਰਜੀਤ ਸਿੰਘ ਲੀਅ ਤੇ ਡਾ. ਜਗਜੀਤ ਸਿੰਘ
- (C) ਡਾ. ਸੁਰਿੰਦਰ ਕੁਮਾਰ ਦਵੇਸ਼ਵਰ ਤੇ ਡਾ. ਜਸਵਿੰਦਰ ਸਿੰਘ ਸੈਣੀ
- (D) ਡਾ. ਜੋਗਿੰਦਰ ਸਿੰਘ ਰਾਹੀ ਤੇ ਡਾ. ਧਨਵੰਤ ਕੌਰ

40 ਪੁਸਤਕ 'ਖੋਜ ਵਿਧੀ: ਸਿਧਾਂਤ ਤੇ ਵਿਹਾਰ' ਦਾ ਲੇਖਕ ਹੈ;

- (A) ਡਾ. ਹਰਿਭਜਨ ਸਿੰਘ ਸਾਗਰ
- (B) ਡਾ. ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼ ਸਿੰਘ
- (C) ਡਾ. ਪਿਆਰ ਸਿੰਘ
- (D) ਡਾ. ਪਿਆਰਾ ਸਿੰਘ ਪਦਮ

41 ਪੰਜਾਬੀ ਦੇਲੋਕਧਾਰਾ ਨਾਲ ਸੰਬੰਧਤ ਖੋਜਕਾਰਾਂ ਦਾ ਸਹੀ ਜੁੱਟ ਹੈ;

- (A) ਨਾਹਰ ਸਿੰਘ ਤੇ ਪ੍ਰੋ. ਮੋਹਨ ਸਿੰਘ
- (B) ਡਾ. ਗੁਰਮੀਤ ਸਿੰਘ ਤੇ ਵਣਜਾਰਾ ਬੇਦੀ
- (C) ਡਾ. ਜਗਜੀਤ ਸਿੰਘ ਤੇ ਡਾ. ਗੁਰਮੁੱਖ ਸਿੰਘ
- (D) ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਤੇ ਡਾ. ਗੁਰਬਖਸ਼ ਸਿੰਘ ਫ਼ਰੈਂਕ

42 ਪੰਜਾਬੀ ਕਿੱਸਾ ਕਾਵਿ ਨਾਲ ਸੰਬੰਧਤ ਖੋਜਕਾਰ ਹਨ;

- (A) ਡਾ. ਗੁਰਚਰਨ ਸਿੰਘ
- (B) ਡਾ. ਗੁਰਚਰਨ ਸਿੰਘ ਅਰਸ਼ੀ
- (C) ਡਾ. ਜਸਵਿੰਦਰ ਸਿੰਘ
- (D) ਡਾ. ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼ ਸਿੰਘ

43 ਕਿਹੜੇ ਕਿੱਸਾਕਾਰ ਨੇ ਦਵੈਯਾ ਛੰਦ ਵਿੱਚ ਕਿੱਸੇ ਦੀ ਰਚਨਾ ਕੀਤੀ ਹੈ;

- (A) ਦਮੋਦਰ ਤੇ ਹਾਸਮ ਸ਼ਾਹ
- (B) ਵਾਰਿਸ ਸ਼ਾਹ ਤੇ ਮੁਕਬਲ
- (C) ਅਹਿਮਦ ਗੁੱਜਰ ਤੇ ਕਾਦਰਯਾਰ
- (D) ਫ਼ਜ਼ਲ ਸ਼ਾਹ ਤੇ ਕਿਸ਼ਨ ਸਿੰਘ ਆਰਿਫ਼

44 ਪੰਜਾਬੀ ਵਿੱਚਕਿਸਨੇ ਨੇਲੋਕ-ਨਾਟਕ ਰੂਪਾਕਾਰ ਨਾਲ ਸੰਬੰਧਤ ਖੋਜ ਕੀਤੀ;

- (A) ਈਸ਼ਵਰ ਚੰਦਰ ਨੰਦਾ
- (B) ਹਰਚਰਨ ਸਿੰਘ
- (C) ਬਲਵੰਤ ਗਾਰਗੀ
- (D) ਸੁਰਜੀਤ ਸਿੰਘ ਸੇਠੀ

45 ਦੁਆਬੇ ਆਂਚਲ ਨਾਲ ਸੰਬੰਧਤ ਨਾਟਕਾਂ ਦਾ ਰਚਨਾਕਾਰ;

- (A) ਅਜਮੇਰ ਔਲਖ
- (B) ਆਤਮਜੀਤ
- (C) ਚਰਨ ਦਾਸ ਸਿੱਧੂ
- (D) ਕਪੂਰ ਸਿੰਘ ਘੁੰਮਣ

ਪੈਰਾ ਪੜ੍ਹ ਕੇ 46-50 ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦਿਉ

ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਸਾਹਿਤ ਦੇ ਭਿੰਨ ਭਿੰਨ ਰੂਪਾਕਾਰਾਂ ਦੇ ਜਨਮ ਸੰਬੰਧੀ ਅਸੀਂ ਆਮ ਤੌਰ 'ਤੇ ਇੱਕ ਪਾਸੜ ਨਜ਼ਰੀਆ ਅਖ਼ਤਿਆਰ ਕਰਦੇ ਹਾਂ। ਹਾਲਾਂਕਿ, ਇਹਨਾਂ ਦੀ ਉਤਪਤੀ ਦੇ ਇੱਕ ਤੋਂ ਵਧੇਰੇ ਪ੍ਰੇਰਿਕ ਦੇਖੇ ਜਾ ਸਕਦੇ ਹਨ ਫਿਰ ਵੀ ਅਸੀਂ ਇਸਦਾ ਇੱਕੋ ਇੱਕ ਕਾਰਨ ਅੰਗਰੇਜ਼ਾਂ ਦਾ ਪੰਜਾਬ ਉਪਰ ਹੋਣ ਵਾਲੇ ਕਬਜ਼ੇ ਨੂੰ ਹੀ ਮੰਨਦੇ ਹਾਂ। ਇਸੇ ਤਰਕ ਦੇ ਆਧਾਰ 'ਤੇ ਮੰਨਿਆ ਜਾਂਦਾ ਹੈ ਕਿ ਪੰਜਾਬੀ ਨਾਵਲ ਦਾ ਆਰੰਭ ਵੀ ਅੰਗਰੇਜ਼ਾਂ ਦੇ ਪੰਜਾਬ ਉਪਰ ਕਬਜ਼ਾ ਕਰਨ ਅਤੇ ਇਥੇ ਆਪਣਾ ਨਿਜ਼ਾਮ ਕਾਇਮ ਕਰਨ ਤੋਂ ਬਾਅਦ ਹੀ ਸੰਭਵ ਹੋਇਆ। ਜਿਸ ਕਰਕੇ ਪੰਜਾਬੀ ਨਾਵਲ ਦੀ ਰੂਪਾਕਾਰਕ ਹੋਂਦ-ਵਿਧੀ ਦਾ ਪੱਛਮੀ ਯੂਰਪ ਦੇ ਯਥਾਰਥ ਅਤੇ ਉੱਥੇ ਪ੍ਰਚਲਿਤ ਹੋਏ ਨਾਵਲ ਦੇ ਰੂਪਾਕਾਰ ਦੀ ਬਣਤਰ ਨਾਲ ਅਜਿਹਾ ਰਿਸ਼ਤਾ ਕਾਇਮ ਹੁੰਦਾ ਹੈ ਜੋ ਕਿਸੇ ਨਾ ਕਿਸੇ ਰੂਪ ਵਿੱਚ ਅੱਜ ਤੱਕ ਨਿਰੰਤਰ ਕਾਇਮ ਹੈ। ਭਾਵੇਂ ਪੰਜਾਬੀ ਨਾਵਲ ਦੇ ਪੈਦਾ ਹੋਣ ਦੇ ਕਾਰਨ ਅਤੇ ਪ੍ਰਸੰਗ ਯੂਰਪੀ ਨਾਵਲ ਤੋਂ ਪੂਰੀ ਤਰ੍ਹਾਂ ਵੱਖਰੇ ਹੋਣ ਦੇ ਨਾਲ ਨਾਲ ਉਲਟ ਵੀ ਹਨ। ਪੰਜਾਬੀ ਨਾਵਲ ਦੇ ਮੁੱਢ ਨੂੰ ਪਹਿਚਾਨਣ ਸਮੇਂ ਇਸ ਨੂੰ ਸਿਰਫ਼ ਯੂਰਪੀ ਨਾਵਲ ਦਾ ਪੰਜਾਬੀ ਰੂਪ ਜਾਂ ਉਨ੍ਹੀਵੀਂ ਸਦੀ ਦੀਆਂ ਧਰਮ ਸੁਧਾਰਕ ਲਹਿਰਾਂ ਦੇ ਪ੍ਰਚਾਰਕ-ਮਨਸ਼ਿਆਂ ਦੀ ਪੂਰਤੀ ਦਾ ਹਿੱਸਾ ਮੰਨਣਾ ਗਲਤ ਹੈ। ਸਗੋਂ ਇਹ ਇਸ ਦੀ ਉਤਪਤੀ ਦੇ ਕਈ ਆਧਾਰਾਂ ਵਿੱਚੋਂ ਸਿਰਫ਼ ਪ੍ਰੇਰਕ ਤੱਤਾਂ ਵਜੋਂ ਕਾਰਜਸ਼ੀਲ ਵੇਖੇ ਜਾ ਸਕਦੇ ਹਨ, ਵਾਹਦ ਨਿਰਧਾਰਕ ਨਹੀਂ।

46 ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਸਾਹਿਤ ਦੇ ਭਿੰਨ ਭਿੰਨ ਰੂਪਾਕਾਰਾਂ ਦੇ ਜਨਮ ਦਾ ਆਧਾਰ ਹੈ:

- (A) ਸਿੱਖ ਰਾਜ ਦਾ ਪਤਨ
- (B) ਅੰਗਰੇਜ਼ਾਂ ਦਾ ਪੰਜਾਬ ਉੱਤੇ ਕਬਜ਼ਾ
- (C) ਬਰਤਾਨਵੀ ਬਸਤੀਵਾਦੀਆਂ ਦਾ ਪੰਜਾਬੀ ਨਾਲ ਪਿਆਰ
- (D) ਉਪਰੋਕਤ ਵਿੱਚੋਂ ਕੋਈ ਵੀ ਨਹੀਂ

47 ਪੰਜਾਬੀ ਨਾਵਲ ਦਾ ਆਰੰਭ ਕਿਵੇਂ ਹੋਇਆ ਮੰਨਿਆ ਜਾਂਦਾ ਹੈ;

- (A) ਅੰਗਰੇਜ਼ਾਂ ਦੇ ਭਾਰਤ ਉੱਪਰ ਕਬਜ਼ਾ ਕਰਨ ਅਤੇ ਰਾਜ ਕਾਇਮ ਕਰਨ ਨਾਲ।
- (B) ਅੰਗਰੇਜ਼ਾਂ ਦੇ ਪੰਜਾਬ ਉੱਪਰ ਕਬਜ਼ਾ ਕਰਨ ਅਤੇ ਰਾਜ ਕਾਇਮ ਕਰਨ ਨਾਲ।
- (C) ਅੰਗਰੇਜ਼ਾਂ ਦੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਤਰੱਕੀ ਲਈ ਕੀਤੇ ਯਤਨਾਂ ਨਾਲ।
- (D) ਨਵੀਂ ਵਿਦਿਆ ਦੇ ਪ੍ਰਚਾਰ ਤੇ ਪ੍ਰਸਾਰ ਨਾਲ।

48 ਪੰਜਾਬੀ ਨਾਵਲ ਦੀ ਰੂਪਾਕਾਰਕ ਹੋਂਦ-ਵਿਧੀ ਦਾ ਸੰਬੰਧ ਕਿਸ ਨਾਲ ਹੈ;

- (A) ਯੂਰਪ ਦੇ ਯਥਾਰਥ ਅਤੇ ਉੱਥੋਂ ਦੇ ਨਾਵਲ ਦੇ ਰੂਪਾਕਾਰ ਨਾਲ।
- (B) ਈਸਾਈ ਮਿਸ਼ਨਰੀਆਂ ਦੇ ਪ੍ਰਚਾਰ ਨਾਲ।
- (C) ਪੰਜਾਬੀ ਬਿਰਤਾਂਤਕ ਰੂਪਾਂ ਨਾਲ
- (D) ਸਿੰਘ ਸਭਾ ਲਹਿਰ ਦੇ ਪ੍ਰਚਾਰ ਨਾਲ

49 ਪੰਜਾਬੀ ਨਾਵਲ ਦੀ ਉਤਪਤੀ ਦੇ ਪ੍ਰੇਰਿਕ ਤੱਤਾਂ ਦਾ ਸਹੀ ਜੁੱਟ ਹੈ;

- (A) ਅੰਗਰੇਜ਼ੀ ਰਾਜ ਪ੍ਰਬੰਧ ਅਤੇ ਆਜ਼ਾਦੀ ਦੀ ਲਹਿਰ
- (B) ਅੰਗਰੇਜ਼ੀ ਰਾਜ ਪ੍ਰਬੰਧ ਅਤੇ ਯੂਰਪੀ ਰੋਮਾਂਸ ਪਰੰਪਰਾ
- (C) ਖ਼ਾਲਸਾ ਰਾਜ ਪ੍ਰਬੰਧ ਅਤੇ ਪੰਜਾਬੀ ਬਿਰਤਾਂਤ ਪਰੰਪਰਾ
- (D) ਅੰਗਰੇਜ਼ੀ ਰਾਜ ਪ੍ਰਬੰਧ ਅਤੇ ਪੰਜਾਬੀ ਬਿਰਤਾਂਤ ਪਰੰਪਰਾ

50 ਪੰਜਾਬੀ ਨਾਵਲ ਦੀ ਉਤਪਤੀ ਦੇ ਪ੍ਰੇਰਿਕ ਤੱਤ ਹਨ;

- (A) ਅੰਗਰੇਜ਼ੀ ਰਾਜ ਪ੍ਰਬੰਧ ਤੇ ਈਸਾਈ ਮਿਸ਼ਨਰੀਆਂ
- (B) ਯੂਰਪੀ ਨਾਵਲ ਰਚਨਾ ਦੀ ਪਰੰਪਰਾ
- (C) ਸਿੰਘ ਸਭਾ ਅਤੇ ਦੂਸਰੀਆਂ ਸਮਾਜ ਸੁਧਾਰਕ ਲਹਿਰਾਂ
- (D) ਇੱਕ ਤੋਂ ਵਧੇਰੇ ਪ੍ਰੇਰਿਕ ਤੱਤ

x-x-x

Physical Education(Ph.D)

1. Who are considered to be the consumers of action research?
(A) Teaching faculty (B) Administrators
(C) Subjects involved in the study (D) Researchers themselves
2. Statements of hypotheses begin with what is assumed to be true based upon
(A) Literature search (B) Self-introspection
(C) Experience (D) Available evidence
3. The large standard error of a distribution of scores is indicative of a less reliable:
(A) Mean (B) Standard Deviation
(C) Median (D) Range
4. To test the hypothesis that group I is better than group II, which of the following statistical technique is appropriate?
(A) 't' test (B) F-test
(C) ANOVA (D) ANCOVA
5. What kind of validity of test is the criterion validity?
(A) Construct (B) Predictive
(C) Content (D) Face
6. Another name of reliability of test is:
(A) Proximity (B) Fidelity
(C) Permeability (D) Consistency
7. The most powerful research tool is a (an)
(A) Survey (B) Experimental
(C) Correlational study (D) Clinical study
8. Which of the elements is not included in a test of health-related test of physical fitness?
(A) Flexibility (B) Endurance
(C) Strength (D) Balance
9. A post-hoc test is:
(A) A test to determine regression to the mean
(B) A follow-up test to the analysis of variance when there are three or more groups
(C) A test to compare two or more means in one overall test
(D) A follow-up test to the independent t-test
10. The *extent to which a test measures what is purpose to measure*, is called its
(A) Specificity (B) Simplicity
(C) Measurability (D) Validity
11. Which of the following is not a type of reliability?
(A) Content (B) Split-half
(C) Test-retest (D) Internal consistency

12. When the researcher fails to reject a null hypothesis, a _____ error occurs.
 (A) Type I (B) Type A
 (C) Type III (D) Type II
13. Sigma is also known as:
 (A) Range (B) Mean Deviation
 (C) Quartile Deviation (D) Standard Deviation
14. Highest category of measuring scale that has all the characteristics of nominal, ordinal and interval scale:
 (A) Rating scale (B) Quality scale
 (C) Ratio scale (D) Balance scale
15. What PowerPoint feature will use to apply motion effects to different objects of a slide?
 (A) Animation Objects (B) Slide Transition
 (C) Animation Scheme (D) Slide Design
16. Who won the gold medal in men's single tennis title at the 2024 Paris Olympics?
 (A) Matthew Ebden (B) Carlos Alcaraz
 (C) Jannik Sinner (D) Novak Djokovic
17. Aristotle is the father of _____.
 (A) Realism (B) Naturalism
 (C) Pragmatism (D) Idealism
18. Who is the president of International Olympic Committee?
 (A) Jacques Count Rogge (B) John Coates
 (C) Thomas Bach (D) Ivo Ferriani
19. Who was India's flag bearer for the Commonwealth Games 2022?
 (A) Neeraj Chopra and Lakshya Sen (B) Manpreet Singh and P.V. Sindhu
 (C) P.V. Sindhu and Lakshya Sen (D) Manpreet Singh and Mirabai
20. What was India's position in the final medals tally at the 2022 Commonwealth Games?
 (A) Second (B) Third
 (C) Fourth (D) Fifth
21. Bones in human body are classified on the basis of:
 (A) Structure and functions (B) Size and shape
 (C) Location and attachment (D) Joint and movement
22. Which of the following is the largest segment of the movable part of the vertebral column?
 (A) Lumbar vertebrae (B) Thoracic
 (C) Cervical (D) Coccygeal
23. What is the weakest bone in the body?
 (A) Clavicle (B) Scapula
 (C) Sternum (D) Coccyx

24. The stapes bone located in the
 (A) Lower ear (B) Upper ear
 (C) Upper nose (D) Middle ear
25. A research design that allows the investigator to infer a cause-and-effect relationships variables is called a (an)
 (A) Survey (B) Experimental
 (C) Correlation (D) Case study
26. Standard psychological tests are usually
 (A) Ordinal scales (B) Ratio scales
 (C) Interval scales (D) Percentile scales
27. The basic materials of the historical research are the
 (A) Secondary sources (B) Primary sources
 (C) Inadvertent evidences (D) Unconscious testimonials
28. Which body type has a high metabolic rate?
 (A) Mesomorph (B) Endomorph
 (C) Ectomorph (D) Obese
29. B. E. Phillips developed the JCR test in:
 (A) 1955 (B) 1957
 (C) 1958 (D) 1959
30. How many trials are there in the McDonald's soccer test?
 (A) Two (B) Three
 (C) Four (D) Five
31. Which of the following is not a principle of sports training?
 (A) Principle of rest (B) Principle of specificity
 (C) Principle of continuity (D) Principle of overload
32. Best procedure to develop flexibility is
 (A) Slow stretching (B) Ballistic
 (C) Slow stretching and holding (D) Fast stretching
33. Incomplete recovery is vital in:
 (A) Fartlek training (B) Cross Country
 (C) Interval training (D) Continuous methods of training
34. Which is not the type of co-coordinative ability?
 (A) Reaction ability (B) Coupling ability
 (C) Orientation ability (D) Static ability
35. In which part of the respiratory system, gaseous exchange takes place?
 (A) Alveoli (B) Trachea
 (C) Larynx (D) Pharynx

36. Blood contains cells which help fight germs. These are the
(A) Platelets (B) Plasma
(C) Red blood cells (D) White blood cells
37. Utility and change are the basic principles of _____.
(A) Realism (B) Pragmatism
(C) Naturalism (D) Idealism
38. From an early age, Spartan boys were trained to be
(A) Teachers (B) Philosophers
(C) Soldiers (D) Leaders
39. Which type of motivation is associated with activities that are enjoyable or satisfying in themselves?
(A) Intrinsic motivation (B) Extrinsic motivation
(C) State motivation (D) Trait motivation
40. How many countries participated in the first modern Olympics in 1896?
(A) 12 (B) 13
(C) 14 (D) 15
41. Which one of the following pair is not correctly matched?
(A) Muscles and tissues (B) Origin and Insertion
(C) Contraction and relaxation (D) Concentric and eccentric
42. The duration of cardiac cycle is:
(A) 0.5 second (B) 0.3 second
(C) 0.8 second (D) 0.6 second
43. Theory of insight learning was propounded by
(A) Pavlov (B) Cattell
(C) Kohler (D) Thorndike
44. Which is another term coined for reinforcement?
(A) Condition (B) Response
(C) Reward (D) None of the above
45. Avinash Sable, who was seen in the news, is associated with which sports?
(A) Steeplechase (B) Tennis
(C) Shooting (D) Archery
46. The AIFF-FIFA Talent Academy was inaugurated in which Indian city?
(A) Chennai (B) Bengaluru
(C) Bhubaneswar (D) Kochi
47. Russell-Lange Volleyball test was developed by French & Cooper in:
(A) 1935 (B) 1942
(C) 1945 (D) 1937

48. The Olympic Museum was opened at which of the following places?
(A) Lausanne (B) Rome
(C) Istanbul (D) Athens
49. The oldest tennis tournament in the world is _____.
(A) US Open (B) French
(C) Australian Open (D) Wimbledon
50. The evaluation which is undertaken during the course of training is called
(A) Formative evaluation (B) Summative evaluation
(C) Normative evaluation (D) Creative evaluation

x-x-x

(ROUGH WORK)

Community Education & Development(Ph.D.)

1. To find the degree of relationships, we have to use a statistical test called
(A) t-test (B) ANOVA
(C) Chi-Square test (D) Pearson's Correlation
2. Operationalization of Variables in research means
(A) Making the variables simple enough to understand
(B) Making the variables measurable
(C) Arranging the variables in a logical order
(D) Making the variables fit for the research
3. The correlation coefficient tends to lie between.....
(A) 0 to +1 (B) +1 to +2 (C) +2 to +1 (D) +1 to -1
4. Which of the following is not a source of data which is appropriate for qualitative study?
(A) Experiments (B) Historical records
(C) Biographies (D) Participant observations
5. Uniting various qualitative methods with quantitative methods can be called as.....
(A) Coalesce (B) Triangulation (C) Bipartite (D) Impassive
6. Action research means _____.
(A) A longitudinal research
(B) An applied research
(C) A research initiated to solve an immediate problem
(D) A research with socioeconomic objective
7. The goodness of fit of a distribution is tested by
(A) T-test (B) Chi-square Test (C) F-test (D) None of these
8. A statement made about a population for testing purposes is called?
(A) Statistic (B) Hypothesis
(C) Level of Significance (D) Test-Statistic
9. If the null hypothesis is false then which of the following is accepted?
(A) Null Hypothesis (B) Positive Hypothesis
(C) Negative Hypothesis (D) Alternative Hypothesis
10. The research intends to explore the result of possible factors for the organization of effective mid-day meal interventions. Which research method will be most appropriate for this study?
(A) Descriptive survey method (B) Historical method
(C) Ex-post facto method (D) Experimental method
11. Tippit table refers to as _____.
(A) Table of random digits
(B) The table used in sampling methods
(C) The table used in statistical investigations
(D) All of these

12. How to judge the depth of any research?
 (A) By research title (B) By research duration
 (C) By research objectives (D) By total expenditure on research
13. On what basis did Jean Piaget give his theory of cognitive development of humans?
 (A) Evaluation Research (B) Fundamental Research
 (C) Applied Research (D) Action Research
14. Action research can be understood as _____.
 (A) A longitudinal research
 (B) An applied research
 (C) A kind of research being carried out to solve a specific problem
 (D) All of the above
15. What is the use of Factorial Analysis?
 (A) For setting the hypotheses
 (B) To understand the difference between two variables
 (C) To understand the relationship between two variables
 (D) To understand the difference between various variables
16. The "Sociogram" technique is used to study _____.
 (A) Vocational Interest (B) Human Relations
 (C) Professional Competence (D) Achievement Motivation
17. Internal and external criticism are the processes involved in
 (A) Historical Research (B) Survey research
 (C) Experimental research (D) Ex-post-facto research
18. Which term from the following may not indicate the intent of qualitative research?
 (A) Understanding (B) Explanation
 (C) Exploration (D) Interpretation
19. Which of the following scales of measurement has a "True Zero Point"?
 (A) Nominal (B) Ordinal (C) Interval (D) Ratio
20. Concepts are _____ of research
 (A) Guide (B) Tools (C) Methods (D) Variables
21. Why do you need to review the existing literature?
 (A) To make sure you have a long list of references
 (B) Because without it, you could never reach the required word-count
 (C) To find out what is already known about your area of interest
 (D) To help in your general studying
22. The first step of research is:
 (A) Selecting a problem (B) Searching a problem
 (C) Finding a problem (D) Identifying a problem
23. Which technique is generally followed when the population is finite?
 (A) Area Sampling Technique (B) Purposive Sampling Technique
 (C) Systematic Sampling Technique (D) None of these

24. The research is always _____.
- (A) Verifying the old knowledge (B) Exploring new knowledge
(C) Filling the gap between knowledge (D) All of these
25. An experimental research problem is not feasible only when:
- (A) It is researchable
(B) It is new and adds something to the knowledge
(C) It consists of independent and dependent variables
(D) It has utility and relevance
26. What rights are Human Rights?
- (A) Rights which are provided by the Constitution of India
(B) Rights which are Fundamental
(C) Rights provided to all human beings by nature
(D) Rights desired by human beings
27. Public Interest Litigation refers
- (A) to mechanism to provide justice out of the Court
(B) to provide speedy justice
(C) to provide justice to poor, needy and weaker sections of society with the help of the NGOs and media
(D) in any statute or act
28. Paulo Freire's approach could be briefly stated as
- (A) Organization of services for people
(B) Mobilization of community leaders
(C) Action-reflection process with people
(D) Identification of target systems for work
29. World Summit on Social Development was held in the year.....
- (A) 1994 (B) 1995 (C) 1996 (D) 1963
30. Panchayati Raj Institutions in India have brought about one of the following
- (A) Eradication of untouchability
(B) Land ownership to depressed classes
(C) A formal representation of weaker sections in village governance
(D) Spread of education
31. The 73 Amendment Act envisages the _____ as the foundation of Panchayati raj institution
- (A) Ward Sabha (B) Gram Sabha (C) Zilla parishad (D) Block Panchayat
32. Sequence the following steps of the Community Organization process :
- (i) Identifying needs
(ii) Exploring the resources
(iii) Prioritizing the needs
(iv) Developing Programmes
- (A) (i) (ii) (iii) (iv) (B) (i) (iii) (ii) (iv) (C) (ii) (i) (iii) (iv) (D) (ii) (i) (iv) (iii)

33. Human Development Report is published by
 (A) World Bank (B) ADB (C) UNDP (D) UNICEF
34. Shareholders, employees, customers, suppliers, vendors and society constitute
 (A) Community (B) Organisation (C) Stakeholders (D) Society
35. A change in behaviour or belief as a result of real or imagined group pressure is
 (A) Compliance (B) Conformity (C) Acceptance (D) Reactance
36. Conformity that involves the public acting in accord with social pressure while privately disagreeing is
 (A) Compliance (B) Acceptance (C) Obedience (D) Reactance
37. Id, Ego, and Super Ego are the three parts of the structures of
 (A) Mind (B) Personality (C) Body (D) Nervous System
38. Educational Equality is a
 (A) Fundamental right (B) Only a customary right
 (C) Only a legal right (D) Only a directive principle
39. We usually avoid remembering something that is associated with fear or unpleasantness. In traditional language, avoidance is termed as
 (A) Suppressing (B) Repression (C) Retrieval future (D) Forgetting
40. According to Montessori_____.
- (A) equipment of schools is more important than the teachers
 (B) knowledge of psychology will be a luxury for teachers
 (C) teachers should interfere in the pupil's behaviour with keen interest
 (D) knowledge of experimental psychology is essential for teachers
41. GDP measures_____.
- (A) Country's income (B) Country's wealth
 (C) Consumer spending (D) Net trade income
42. A person-centred counsellor's role would best be described as a
 (A) Coach (B) Facilitator (C) Expert (D) Dictator
43. Empathy could best be described as
 (A) Feeling of what a client is feeling and conveying this to the client
 (B) Deep sympathy
 (C) Careful ongoing assessment
 (D) Carefully
44. Person-centered counseling is a form of
 (A) Psychoanalytic psychotherapy (B) Adlerian therapy
 (C) Humanistic psychotherapy (D) Rogerian psychotherapy
45. The National Policy of Education was approved by the Government of India in the year
 (A) 1986 (B) 1985 (C) 1984 (D) 1983
46. A system by which a society ranks categories of people in a hierarchy is called
 (A) Social inequality (B) Social mobility
 (C) Stereotyping (D) Social stratification

47. Sarva Shiksha Abhiyan (SSA) was launched in the IXth Five-Year Plan to
- (A) Bridge all the gender and social gaps in education
 - (B) Universalisation of Elementary Education
 - (C) Education for all
 - (D) Education for the weaker sections
48. Special education is a branch of education that deals with _____.
- (A) Educating children in special schools
 - (B) To provide opportunities of special to students
 - (C) Instructions designing for students with special needs
 - (D) More than one of the above
49. The legal provision in India that mandates a certain percentage of Government Jobs for persons with disabilities is under :
- (A) The Rights of Persons with Disabilities Act
 - (B) The Employment of Disabled Persons Act
 - (C) The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act
 - (D) The Disabilities Act
50. Podcasts and Vodcasts are useful for students with _____.
- (A) Dyslexia
 - (B) Visual impairment with severe mental impairment
 - (C) Severe mental impairment
 - (D) Person without disabilities

x-x-x

(ROUGH WORK)

Faculty of Business Management & Commerce

1. Which of the following philosophers is primarily associated with developing the early framework of positivist philosophy?
(A) Immanuel Kant (B) Auguste Comte
(C) Friedrich Nietzsche (D) David Hume
2. In the context of positivism, which method is emphasized for acquiring and validating knowledge?
(A) Introspection (B) Deductive reasoning
(C) Empirical and scientific methods (D) Qualitative ethnography
3. Which statement best reflects the positivist view on the nature of reality?
(A) Reality is multiple and constructed through individual experiences.
(B) Reality is objective and can be empirically observed and measured.
(C) Reality is subjective and varies from one person to another.
(D) Reality is unknowable and beyond human comprehension.
4. Interpretivist research typically prioritizes which of the following methods to understand social phenomena?
(A) Controlled experiments and statistical analysis.
(B) Objective measurements and data collection.
(C) Qualitative methods and detailed case studies.
(D) Purely theoretical discussions without empirical data.
5. Which statement best describes the primary goal of basic research?
(A) To develop specific solutions to practical problems.
(B) To explore fundamental principles and theories without immediate application.
(C) To enhance the efficiency of industrial processes.
(D) To assess the effectiveness of technological innovations in real-world settings.
6. What is a typical outcome of the inductive approach in research?
(A) Confirmation of universal laws through repeated experimentation.
(B) Development of broad generalizations that apply across different contexts without further verification.
(C) Generation of new theories and models from the data collected.
(D) Strict adherence to pre-defined theoretical constructs without modification.
7. What role does the research problem play in the design of a research study?
(A) It dictates the choice of research design, methods of data collection, and analysis techniques.
(B) It serves mainly as a formal requirement for academic proposals without influencing the study design.
(C) It limits the scope of the study to what has previously been explored to ensure safety and ethical compliance.
(D) It focuses only on providing a context for budget negotiations in project funding.

8. What is the primary purpose of a conceptual model in academic research?
- (A) To serve as a decorative element in research presentations.
 - (B) To provide a simplified visual representation of the relationships between concepts and variables.
 - (C) To replace the need for empirical data in theoretical studies.
 - (D) To increase the complexity of the research design unnecessarily.
9. What role does randomization play in experimental designs?
- (A) It ensures that the researcher's personal biases influence the results.
 - (B) It distributes potential confounding variables evenly across experimental and control groups.
 - (C) It allows for the use of qualitative methods in data collection.
 - (D) It simplifies the process of selecting the research variables.
10. Which statement best describes stratified sampling?
- (A) The population is divided into heterogeneous groups before the sample is drawn randomly from these groups.
 - (B) The population is divided into homogeneous group based on a specific characteristic, and random samples are then drawn from each stratum.
 - (C) Samples are collected at specific times from predetermined locations to ensure diversity.
 - (D) Random sampling is avoided in favor of convenience sampling to save time and resources.
11. What best describes a randomized block design?
- (A) A design that randomly assigns subjects to treatments, grouping them based on a specific blocking factor to reduce variability.
 - (B) A design where subjects are randomly assigned without any consideration for potential confounding variables.
 - (C) A design primarily used in observational studies where no interventions are applied.
 - (D) A design that ensures all participants receive every treatment in a sequential order.
12. What distinguishes theoretical sampling from other sampling methods in qualitative research?
- (A) It involves selecting samples based solely on their availability and convenience.
 - (B) It prioritizes sampling from a diverse population to ensure generalizability of the results.
 - (C) It is an iterative process where data collection and analysis are conducted simultaneously to inform future sampling decisions based on emerging theoretical insights.
 - (D) It requires a fixed sample size determined before the initiation of the research process.

13. Which data collection method is most commonly used in phenomenological research?
- (A) Standardized questionnaires to gather numerical data.
 - (B) Detailed interviews and discussions to understand the depth of participants' experiences.
 - (C) Laboratory experiments to observe behavior under controlled conditions.
 - (D) Statistical sampling to ensure a representative distribution of the population.
14. What is the purpose of "bracketing" in qualitative research?
- (A) To ensure that all participants in the study receive the same questions in an interview.
 - (B) To remove all forms of bias from the research findings completely and permanently.
 - (C) To acknowledge and set aside the researcher's preconceptions and biases to engage with the data more objectively.
 - (D) To use statistical methods to adjust the data for any potential biases detected during analysis.
15. What is a construct in the context of social science research?
- (A) A tangible, directly observable entity that can be measured without interpretation.
 - (B) An abstract idea or concept that represents phenomena which are not directly observable.
 - (C) A statistical method used to analyze the relationships between measured variables.
 - (D) A tool used exclusively in quantitative research to control experimental conditions.
16. In a normal distribution, what percentage of the data falls within one standard deviation of the mean?
- (A) Approximately 68%
 - (B) About 50%
 - (C) Nearly 95%
 - (D) Exactly 100%
17. Which of the following statements is correct about interpreting a p-value?
- (A) A smaller p-value (typically less than 0.05) suggests that the observed data are highly consistent with the null hypothesis.
 - (B) A p-value greater than 0.05 indicates strong evidence in favor of the alternative hypothesis.
 - (C) A small p-value, such as less than 0.05, indicates that the null hypothesis can be rejected with a confidence level of 95%.
 - (D) A p-value indicates the probability that the research results occurred by chance.
18. Which of the following factors can increase the risk of committing a Type I error?
- (A) Decreasing the significance level (alpha).
 - (B) Increasing the significance level (alpha).
 - (C) Conducting a more conservative test.
 - (D) Using a smaller sample size.

19. What best describes the standard error?
- (A) The variability of a sample statistic from sample to sample, estimating how far the sample mean is likely to be from the population mean.
 - (B) The error associated with failing to include the entire population in the study.
 - (C) A measurement of bias in data collection techniques.
 - (D) The error caused by measuring the wrong variable.
20. What does R^2 , or the coefficient of determination, measure in a regression analysis?
- (A) The proportion of the variance in the dependent variable that is predictable from the independent variables.
 - (B) The absolute fit of the regression model to the data.
 - (C) The correlation between each pair of independent variables.
 - (D) The percentage of variance in the independent variable explained by the dependent variable.
21. Which type of reliability refers to the consistency of results across items within a test?
- (A) Test-retest reliability
 - (B) Inter-rater reliability
 - (C) Internal consistency reliability
 - (D) Parallel-forms reliability
22. What is the primary purpose of conducting an independent samples t-test?
- (A) To determine if there is a significant difference between the means of two related or paired groups.
 - (B) To compare the means of two independent groups to see if there is a statistically significant difference.
 - (C) To assess the relationship and correlation between two continuous variables.
 - (D) To evaluate the variance within a single group of subjects.
23. What is the correct APA citation for a journal article with a DOI?
- (A) Smith, S., & Lee, L. (2020). Climate change challenges. *Journal of Environmental Research*, 5(1), 100-110. DOI: 10.1234/jer.2020.0543.
 - (B) Smith, S., & Lee, L. (2020). Climate change challenges. *Journal of Environmental Research*, 5(1), 100-110. <https://doi.org/10.1234/jer.2020.0543>.
 - (C) Smith, S. & Lee, L. (2020). "Climate Change Challenges," *Journal of Environmental Research*, vol. 5, no. 1, pp. 100-110, doi: 10.1234/jer.2020.0543.
 - (D) Smith, S., & Lee, L. (2020). Climate Change Challenges: *Journal of Environmental Research*, 5(1), pp.100-110. DOI: 10.1234/jer.2020.0543.
24. What is the primary purpose of conducting a meta-analysis?
- (A) To confirm the findings of a single landmark study.
 - (B) To statistically analyze variations and trends across different research studies.
 - (C) To provide an exhaustive summary of all literature on a topic without statistical synthesis.
 - (D) To test a new hypothesis that has not been previously explored.
25. What is the primary purpose of developing a detailed search strategy in academic research?

- (A) To randomly explore different databases and sources without a predefined plan.
- (B) To focus exclusively on one database to simplify the research process.
- (C) To rely solely on recommendations from colleagues without checking original sources.
- (D) To ensure that the search for relevant literature is systematic, comprehensive, and reproducible.
- 26.** What is the main purpose of conducting horizontal analysis on financial statements?
- (A) To determine the variability of a company's performance over multiple periods.
- (B) To compare the financial metrics of different companies in the same industry.
- (C) To calculate the internal rate of return for invested capital.
- (D) To analyze the changes in financial statement items over a period of time.
- 27.** How does a higher SLR impact the banking system?
- (A) It allows banks to lend more freely to the public and businesses, thereby promoting economic growth.
- (B) It restricts the amount of money that banks can lend, as more funds must be kept in liquid or near-liquid assets.
- (C) It decreases the financial stability of banks by reducing their investment in secure assets.
- (D) It has no impact on lending capabilities but increases the administrative burden on banks.
- 28.** What is a key activity performed by insurance companies to manage risk?
- (A) Assessment of the potential risk associated with an insurance policy applicant.
- (B) Investment in diversified financial instruments.
- (C) Frequent restructuring of organizational hierarchies.
- (D) Developing new financial products unrelated to insurance.
- 29.** Which of the following is NOT one of the commonly recognized components of emotional intelligence?
- (A) Self-awareness (B) Self-regulation
- (C) Cognitive dissonance (D) Social skills
- 30.** Why is it important to include human resource valuation in financial reporting?
- (A) To understand the geographical distribution of employees.
- (B) To help stakeholders assess the true value of the company's human capital.
- (C) To simplify the accounting process.
- (D) To focus solely on the quantifiable assets of the company.
- 31.** What is the primary goal of Search Engine Optimization (SEO)?
- (A) To enhance the functionality of a website's database.
- (B) To increase a website's visibility and ranking in search engine results pages (SERPs).
- (C) To secure a website from potential cyber threats.
- (D) To increase the loading speed of web pages.

32. What best describes a buyer persona?
- (A) A semi-fictional character that represents a key segment of a company's target audience based on research and data.
 - (B) A detailed profile of a company's actual customers based solely on their financial status.
 - (C) A generalized demographic profile that applies universally across all marketing strategies.
 - (D) A legal document outlining the responsibilities of the customer towards the company.
33. What best describes the Service Recovery Paradox?
- (A) It's the theory that service failures are best left unaddressed to minimize cost.
 - (B) It's the decrease in customer satisfaction due to frequent service failures, despite efforts to make amends.
 - (C) It suggests that the more often service recovery is initiated, the lower the overall customer satisfaction.
 - (D) It refers to a situation where a customer's loyalty increases after a company effectively resolves a service failure, potentially exceeding the loyalty level prior to the failure.
34. What does the Absorption Theory of Balance of Payments suggest?
- (A) A BOP deficit occurs if a country's domestic absorption of goods exceeds its output.
 - (B) A country must always maintain a balance between imports and exports to sustain economic growth.
 - (C) BOP is solely influenced by governmental fiscal policies.
 - (D) Exchange rates have no significant impact on BOP.
35. What is the purpose of cluster analysis in data mining?
- (A) To identify a set of redundancies in database systems.
 - (B) To distribute data across different servers.
 - (C) To group a set of objects in such a way that objects in the same group are more similar to each other than to those in other groups.
 - (D) To encrypt data for secure transmission.
36. What is a primary component of a PERT chart?
- (A) Nodes representing events or milestones within the project.
 - (B) A graphical representation of a project's budget.
 - (C) A list of team members assigned to a project.
 - (D) A Gantt chart of daily activities.
37. Which of the following is a common model of Public-Private Partnership?
- (A) Build-Operate-Transfer (BOT)
 - (B) Public-Only Investment Model
 - (C) Private Sector Leasing
 - (D) Sole Entrepreneurship
38. What is a major criticism of Scientific Management?
- (A) It overly focuses on worker satisfaction and personal development.
 - (B) It treats workers as machines, emphasizing efficiency over human needs.
 - (C) It requires excessive investment in technology.
 - (D) It promotes too much social interaction in the workplace.

- 39.** What is a key strategy businesses use to manage the impacts of external economic and non-economic forces?
- (A) Ignoring external forces until they directly affect the bottom line.
 - (B) Conducting regular environmental scans to anticipate changes and adapt strategies accordingly.
 - (C) Focusing solely on internal operations and employee management.
 - (D) Limiting their operations to local markets to avoid external forces.
- 40.** What is a key difference between International Financial Reporting Standards (IFRS) and Generally Accepted Accounting Principles (GAAP) in the U.S.?
- (A) IFRS allows more judgment and estimates in financial reporting compared to the more prescriptive nature of GAAP.
 - (B) IFRS is primarily rules-based, while GAAP is principles-based.
 - (C) GAAP is used worldwide, whereas IFRS is only used in the European Union.
 - (D) GAAP focuses more on the transparency of financial statements than IFRS.
- 41.** What additional document is typically required when exporting agricultural products?
- (A) Health and Safety Certification
 - (B) Free Sale Certificate
 - (C) Certificate of Origin
 - (D) Phytosanitary Certificate
- 42.** What is a major challenge businesses face when integrating AI technologies?
- (A) Convincing customers to exclusively use AI services.
 - (B) Overcoming technical complexities and the need for significant investment in skilled personnel and infrastructure.
 - (C) Deciding on the coding schemes for AI interfaces.
 - (D) Ensuring all AI systems are fully autonomous without human oversight.
- 43.** What best describes a large language model (LLM)?
- (A) A type of software focused on generating numerical data predictions.
 - (B) A compact model used primarily for quick calculations on small mobile devices.
 - (C) A traditional statistical model used for simple text corrections.
 - (D) A deep learning model designed to understand, generate, and translate human language based on training with large datasets.
- 44.** Which technology is fundamental to the operation of generative AI models?
- (A) Static decision tree algorithms.
 - (B) Basic linear regression models.
 - (C) Neural networks, particularly those designed for deep learning, like GANs and RNNs
 - (D) Simple calculative algorithms used in traditional computing.
- 45.** What is MICR primarily used for in banking?
- (A) Encrypting customer data on bank cards.
 - (B) Detecting counterfeit currency.
 - (C) Reading characters printed in magnetic ink on cheques for processing.
 - (D) Wireless data transmission between banking systems.

46. What does "QR" in "QR Code" stand for?
(A) Quick Response (B) Quality Review
(C) Quantitative Reasoning (D) Query Response
47. Who is the author of the popular personal finance book "Rich Dad Poor Dad"?"
(A) Tony Robbins (B) Robert Kiyosaki (C) Stephen Covey (D) Warren Buffett
48. What is the primary focus of the Diffusion of Innovation Theory?
(A) To analyze how companies can maximize their profits with minimal investment in innovation.
(B) To describe how new ideas and technologies spread through different populations and social systems over time.
(C) To determine the psychological impact of new technologies on individual users.
(D) To study the market trends that lead to the failure of new products.
49. What is a major challenge in implementing the Sustainable Development Goals globally?
(A) Lack of public awareness and commitment at the individual level.
(B) Overemphasis on technological solutions at the expense of traditional methods.
(C) Too much focus on short-term goals, ignoring long-term sustainability.
(D) Coordination and funding issues that hinder effective collaboration and resource allocation among countries.
50. What does "UPI" stand for in the context of digital payments?
(A) Unified Payments Interface (B) Universal Payment Integration
(C) United Payment Interface (D) Unified Payment Identity

x-x-x

Vocal & Instrumental(Ph.D.)

1. **Term DAYAWATI stands for**
(A) Rag (B) Shruti (C) Swar (D) Murchhna
2. **Founder of Gwalior Gharana**
(A) Hassu Khan (B) Sujan Khan
(C) Natthan Peerbaksh Khan (D) Chand Khan
3. **Author of Rag Vibodh**
(A) Pt. Ramamtya (B) Pt. Bhatkhande (C) Pt. Sharang Dev (D) Pt. Somnath
4. **Name the Guru of Pt. Panna Lal Ghosh**
(A) Ust. Alladiya Khan (B) Ust. Allauddin Khan
(C) Ust. Imdad Khan (D) Vidushi Annapurna Devi
5. **Meaning of Research is**
(A) Bibliography (B) Synopsis (C) Research Proposal (D) Anusandhan
6. **Swar Sangati of Rag Bhatiyar is**
(A) Sa - Ma (B) Sa - Pa (C) Sa – Dha (D) Sa – Ga
7. **Distance of Shruti of Shadaj- Pancham Samvad is**
(A) 9 (B) 11 (C) 13 (D) 15
8. **What is the Part of Dhrupad Shaili**
(A) Aalap (B) Taan (C) Upaj (D) Sargam
9. **Which book was written in thirteen century**
(A) Natyashastra (B) Brihaddeshi (C) Sangeet Ratnakar (D) Rag Tarangini
10. **Name the pen name of Pt. Ramashrey Jha**
(A) Premrang (B) Sabrang (C) Nehrang (D) Ramrang
11. **Name the Taal having 7 Matras**
(A) Teevra (B) Sultal (C) Adachartal (D) Dhamar
12. **Books consulted during research mentions in the thesis under the head of**
(A) Index (B) Appendix (C) Bibliography (D) Conclusion
13. **Pt. Durga Lal is known for Dance form**
(A) Kathak (B) Kuchipudi (C) Odissi (D) Bharatnatyam
14. **First string of Sitar is tuned in**
(A) Ma (B) Pa (C) Ga (D) Sa
15. **Which Raag sung in the Night**
(A) Puriya (B) Marwa (C) Sohni (D) Poorvi
16. **Pranav Bharti is written by**
(A) Pt. Bhatkhande (B) Pt. Ramashrey Jha
(C) Pt. Onkar Nath Thakur (D) Pt. Ranadey
17. **Strings are used in sitar of Senia Gharana are**
(A) 16 (B) 17 (C) 18 (D) 19

- 18. Pt. Ratanjankar belongs to Gharana**
 (A) Jaipur (B) Agra (C) Kirana (D) Patiala
- 19. Number of Taals of 10 beats used in classical music are**
 (A) 2 (B) 3 (C) 4 (D) 5
- 20. How many Banis are there in Dhrupad?**
 (A) 3 (B) 4 (C) 5 (D) 6
- 21. Begham Parveen Sultana is famous for**
 (A) Khayal (B) Dhrupad (C) Dhamar (D) Ghazal
- 22. Pt. Jagannath Bua Purohit was disciple of**
 (A) Ust. Vilayat Khan (B) Ust. Vilayat Hussain Khan
 (C) Pt. Ratanjankar (D) Pt. Ravi Shankar
- 23. Author of Swarmelkalanidhi**
 (A) Ghulam Rasool (B) Ramamatya (C) Vyankatmakhi (D) Lochan
- 24. Which is known as Audav Rag**
 (A) Multani (B) Madhuvanti (C) Madhukauns (D) Marwa
- 25. Which Taal has SAM on Khali**
 (A) Rudra (B) Rupak (C) Sultaal (D) Teevra
- 26. Gharana of Vidushi Mongubai Kurdikar is**
 (A) Agra (B) Jaipur (C) Kirana (D) Patiala
- 27. Pt. Ramakant Gundecha is known for**
 (A) Khayal (B) Thumri (C) Dhrupad (D) Bhajan
- 28. Who is famous for Sitar playing**
 (A) Pt. Ravishankar (B) Pt. Kartik kumar
 (C) Ust. Vilayat khan (D) Pt. Niladrikumar
- 29. Pen Name of Dhruvtara Joshi is**
 (A) Premrang (B) Nehrang (C) Sabrang (D) Dilrang
- 30. Which is not a part of Research**
 (A) Data collection (B) Synopsis (C) Composing (D) Footnotes
- 31. Name the Guru of Pt. Ravi Shankar**
 (A) Alladiya Khan (B) Allauddin Khan
 (C) Allabande Khan (D) Allarakkha Khan
- 32. Ada Chartal ends with the Bol**
 (A) Dha (B) Dhin (C) Ti (D) Na
- 33. Which Gharana pays special attention to LAYKARY**
 (A) Agra (B) Gwalior (C) Jaipur (D) Kirana
- 34. Pt. Hariprasad Chaurasia is known for**
 (A) Flute (B) Tabla (C) Violin (D) Sarod
- 35. Dhamar Taal having division of matras as**
 (A) 5234 (B) 5243 (C) 5432 (D) 5423

- 36. Which instrument is not played by Mizrab**
 (A) Sitar (B) Guitar (C) Surbahar (D) Sarod
- 37. Which pair of raag has similar swaras**
 (A) Kedar- Hameer (B) Bageshree - Rageshree
 (C) Kamod - Chhayanat (D) Puriya - Marwa
- 38. Which Baj is not belonging to sitar from the following**
 (A) Maseetkhani (B) Razakhani (C) Firozkhani (D) Kirwani
- 39. A female famous Bharatnatyam Dancer**
 (A) Sonal Man Singh (B) Protima Bedi
 (C) Meenakshi Sheshadri (D) Swaphasundari
- 40. Name the famous violinist**
 (A) Jaya Biswas (B) Kala Ramnathan
 (C) Sharan Rani (D) Zareen Daruwala
- 41. Ga Ma Dha Dha Pa, Dha Pa Ma, Ga Ma Re Re Sa.....indicates which Raag**
 (A) Bhairav (B) Deshkar (C) Kalawati (D) Bilawal
- 42. Which is related to Research**
 (A) Index (B) Notation (C) Ras (D) Aesthetics
- 43. Sangeet Parijat was written by**
 (A) Shree Nivas (B) Vyankatmakhi (C) Ahobal (D) Ramamatya
- 44. How many swaras are used in Raag Megh?**
 (A) 5 (B) 6 (C) 7 (D) 8
- 45. Name the Raag with Two Madhyam**
 (A) Jog (B) Tilang (C) Basant (D) Kalingda
- 46. According to which Notation system the Swaras are known as Do, Mi, Fa, Sol, La, Si.**
 (A) Solfa Notation (B) Neumes Notation (C) Cheve Notation (D) Staff Notation
- 47. Laggi is used in**
 (A) Khayal (B) Dhrupad (C) Thumri (D) Tarana
- 48. The Rag which has the same name of THAT is called**
 (A) Mishra rag (B) Ashraya rag
 (C) Sandhi Prakash Rag (D) Chhayalag rag
- 49. According to Bhatkhande Notation System KHALI is denoted by**
 (A) + (B) o (C) 3 (D) x
- 50. Chikari string is used for playing**
 (A) Gat (B) Jhala (C) Zam Zama (D) Meend

x-x-x

Computer Science Engineering(Ph.D.)

1. Assume a system having m resources of the same type. These resources are shared by the 3 processes A, B, C, which have peak demands of 3, 4 and 6 respectively. For what value of m , the deadlock will not occur
(A) 7 (B) 9 (C) 10 (D) 13
2. A memory page which contains a heavily used variable that was initialized very early and is in constant usage is removed when
(A) LRU page replacement algorithm is used (B) FIFO page replacement algorithm is used
(C) LFU page replacement algorithm is used (D) None of these
3. Principle of locality justifies the use of
(A) Interrupts (B) Cache memory (C) DMA (D) Polling
4. A 1000 Kbytes memory is managed using variable partitions with compaction. It currently has two partitions of sizes 200 Kbytes and 260 Kbytes respectively. The smallest allocation request in Kbytes that could be denied is for
(A) 541 (B) 231 (C) 181 (D) 151
5. A counting semaphore was initialized to 10. Then 6 P (wait) operations and 4 V(signal) operations were completed on this semaphore. The value of the semaphore will be
(A) 0 (B) 8 (C) 10 (D) 12
6. Which of the following disk scheduling strategies is likely to give the best throughput?
(A) Farthest cylinder next (B) Nearest cylinder next
(C) First come first served (D) Elevator algorithm
7. Which are the advantages of virtual memory?
(A) Faster access to memory on an average
(B) Linker can assign addresses independent of where the program will be loaded in physical memory
(C) Program larger than the physical memory can be run
(D) Both B and C
8. A hard disk system has the following parameters: Number of tracks are 500, no. of sectors per track are 100, no. of bytes per sector are 500, the time taken by the head to move from one track to adjacent track is 1ms and rotation speed is 600 rpm. What is the average time taken for transferring 250 bytes from the disk?
(A) 300.5 ms (B) 255.5 ms (C) 255 ms (D) 300 ms
9. Relation R with an associated set of functional dependencies, F is decomposed into BCNF. The redundancy (arising out of functional dependencies) in the resulting set of relations is
(A) more than zero but less than that of an equivalent 3NF decomposition
(B) Zero
(C) Proportional to size of F
(D) Not determined
10. With regard to the expressive power of the formal relational query language, which of the following statement is true?
(A) Relational algebra is more powerful than safe relational calculus

- (B) Relational algebra has same power as safe relational calculus
- (C) Relational algebra is less powerful than safe relational calculus
- (D) Relational algebra is less powerful than unsafe relational calculus

11. Which of the following can lead to unrecoverable error in a database system?

- (A) A transaction writes a data item after it is read by an uncommitted transaction
- (B) A transaction reads a data item after it is read by an uncommitted transaction
- (C) A transaction reads a data item after it is written by a committed transaction
- (D) A transaction reads a data item after it is written by an uncommitted transaction

12. Consider the following C program:

```
void convert(int n) {
    if (n < 0)
        printf(" % d", n);
    else {
        convert(n / 2);
        printf(" % d", n % 2);
    }
}
```

Which one of the following will happen when the function *convert* is called with any positive integer *n* as argument?

- (A) It will print the binary representation of *n* in the reverse order and terminate.
- (B) It will not print anything and will not terminate.
- (C) It will print the binary representation of *n* but will not terminate.
- (D) It will print the binary representation of *n* and terminate.

13. Consider the following C program:

```
#include<stdio.h>
int main(){
    int arr[] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 0, 1, 2, 5}, *ip = arr + 4;
    printf("%d\n", ip[1]);
    return 0;
}
```

The number that will be displayed on execution of the program is _____.

- (A) 4
- (B) 5
- (C) 6
- (D) segmentation error

14. The maximum data rate of a channel for a noiseless 2-kHz binary channel is

- (A) 2000bps
- (B) 4000bps
- (C) 1000bps
- (D) None of these

15. Which of the following is not a client-server application?

- (A) Internet Chat
- (B) Ping
- (C) E-mail
- (D) Web browsing

16. According to Brooks, if *n* is the number of programmers in a project team, then the number of communication path is

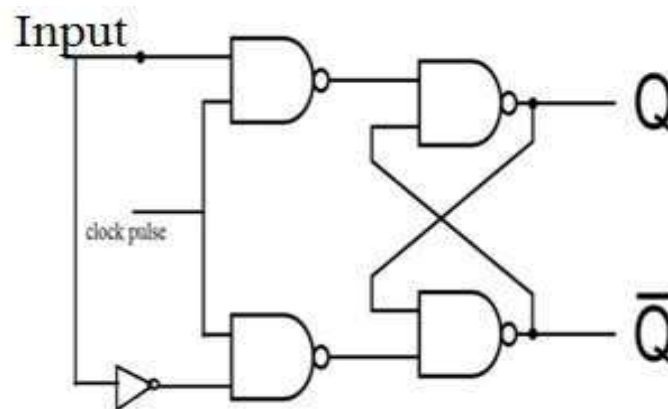
- (A) $n(n-1)/2$
- (B) $n \log n$
- (C) n
- (D) $n(n+1)/2$

17. A program P calls two subprograms P1 and P2. P1 can fail 50% times and P2 can fail 40% times, then P can fail

- (A) 50%
- (B) 60%
- (C) 10%
- (D) 70%

18. The concatenation of two lists is to be performed on $O(1)$ time. Which of the following implementation of a list should be used?
 (A) Single linked list (B) Doubly linked list
 (C) Circularly double linked list (D) Array implementation of list
19. Heap allocation is required for languages
 (A) that support recursion (B) that support dynamic data structures
 (C) that uses dynamic scope rules (D) none of these
20. Choose the incorrect statement
 (A) Go-Back-N method requires more storage at receiving end
 (B) Selective repeat has better line utilization
 (C) Selective repeat involves complex logic than Go-Back-N
 (D) None of these
21. A network with CSMA/CD protocol in the MAC layer is running at 1Gbps over a 200m cable. The signal speed in the cable is 2×10^8 m/sec. The minimum frame size for this network should be
 (A) 250 bytes (B) 125 bytes (C) 500 bytes (D) 500 bits
22. Count to infinity is a problem associated with
 (A) Link state routing protocol (B) Distance vector routing protocol
 (C) DNS while resolving host name (D) TCP for congestion control
23. Which of the following algorithm is non-preemptive?
 (A) Round robin (B) FIFO
 (C) Multilevel queue scheduling (D) Multilevel queue scheduling with feedback
24. In a system with 32 bit virtual addresses and 1KB page size, use of one level page tables for virtual to physical address translation is not practical because of
 (A) The large amount of internal fragmentation
 (B) The large amount of external fragmentation
 (C) The large memory overhead in maintaining page tables
 (D) The large computation overhead in the translation process
25. Perform the following operation for binary equivalent of the decimal numbers $(-14)_{10} + (-15)_{10}$. The solution in 8 bit representation by using 2's compliment is:
 (A) 11110011 (B) 00011101 (C) 10011101 (D) 111100011
26. A binary tree whose every node has either zero or two children is called
 (A) Complete binary tree (B) Binary search tree
 (C) Extended binary tree (D) Full Binary Tree
27. Which of the following sorting algorithm follows the divide-and-conquer strategy?
 (A) Bubble sort (B) Insertion sort (C) Quick sort (D) Both B & C
28. The way a card game player arranges his cards as he picks them up one by one, is an example of which sorting algorithm
 (A) Insertion sort (B) Selection sort (C) Bubble sort (D) Merge sort
29. The depth of a complete binary tree with 'n' nodes is (log is to the base two):
 (A) $\log(n)$ (B) $\log(n + 1) - 1$ (C) $\log(n - 1) + 1$ (D) $\log(n) + 1$
30. Linked lists are not suitable for implementing:
 (A) Insertion sort (B) Radix sort

- (C) Polynomial manipulation (D) Binary search
31. Which of the following algorithm solves the all-pair shortest path problem
 (A) Dijkstra's algorithm (B) Floyd's algorithm
 (C) Prim's algorithm (D) Warshall's algorithm
32. When in-order traversing a tree resulted T P R Z U X S Q V; the preorder traversal would return
 (A) UPTZRSRZV (B) UPTZRSXVQ (C) TPUZXSRQV (D) UTPZSRXQV
33. When representing any algebraic expression P which uses only binary operations in a 2-tree,
 (A) the variables and operations in P will appear only in internal nodes
 (B) the variables and operations in P will appear only in external nodes
 (C) the variables in P will appear as internal nodes and operations in external nodes
 (D) the variables in P will appear as external nodes and operations in internal nodes
34. If every node, u , in graph G, is adjacent to every other node, v , in G, A graph is said to be
 (A) Isolated (B) Finite (C) Strongly connected (D) Complete
35. Spooling is most beneficial in a multiprogramming environment where:
 (A) Most jobs are I/O bound
 (B) Most jobs are CPU-bound
 (C) Jobs are evenly divided as I/O bound and CPU-bound
 (D) There is limited primary memory and need for secondary memory
36. Let G be a complete undirected graph on 6 vertices. If vertices of G are labeled, then the number of distinct cycles of length 4 in G is equal to
 (A) 15 (B) 30 (C) 90 (D) 360
37. The mean and standard deviation of a binomial distribution are 10 and 2 respectively. The value of P is
 (A) 1.0 (B) 0.8 (C) 0.6 (D) 0.4
38. If the mode of a data is 18 and mean is 24, then median is
 (A) 18 (B) 24 (C) 22 (D) 21
39. The 2's complement 8-bit representation of -30 is
 (A) 10011110 (B) 10001111 (C) 11100010 (D) 11110010
40. The following digital circuit performs the function of a sequential circuit. Identify it.



- (A) T flip-flop (clocked) (B) D flip flop (clocked)
 (C) 2-bit ripple counter (D) 2-bit synchronous counter

41. The result of the following conversion is $(3672)_8$ to $(?)_{16}$
 (A) A7B (B) 3CB (C) 9BA (D) 7BB
42. $(A+B)(AB)'$ is equivalent to
 (A) $A \oplus B$ (B) $A \odot B$ (C) $(A \oplus B) \odot A$ (D) $(A \odot B) \oplus A$
43. A machine stores floating point numbers in 7-bit word. The first bit is stored for the sign of the number, the next three for the biased exponent and the next three for the magnitude of the mantissa. In order to represent 35.35 in the above representation, the error that would be reported is
 (A) Underflow (B) Overflow
 (C) NaN (D) No error will be registered
44. The probability that two friends share the same birth month is
 (A) 1/6 (B) 1/12 (C) 1/144 (D) 1/24
45. Suppose A is a finite set with n elements. The number of elements in the largest equivalence relation of A is
 (A) 1 (B) n (C) $n+1$ (D) n^2
46. The number of distinct relations on a set of 3 elements is
 (A) 8 (B) 9 (C) 18 (D) 512
47. The total number of partitions of a set having four elements is
 (A) 16 (B) 8 (C) 15 (D) 4
48. Suppose a license plate contains two letters followed by three digits with the first digit not zero. How many different license plates can be printed?
 (A) 608000 (B) 608200 (C) 608400 (D) 608600
49. Are the tags elements in XML case sensitive?
 (A) No (B) Yes
 (C) It depends on the browser (D) None of these
50. Which command displays the list of all previous commands entered by the user?
 (A) COMMANDS/ALL (B) KEYDOS
 (C) DOSKEY (D) DIR/ALL

x-x-x

(ROUGH WORK)

Mechanical Engineering(Ph.D.)

- The base of a brass bracket needs rough grinding. For this purpose, the most suitable grinding wheel grade specification is
(A) A50G8V (B) A30D12V (C) C30Q12V (D) C90J4B
- Two plates, each of 6 mm thickness, are to be butt-welded. Consider the following processes and select the correct sequence in increasing order of size of the heat affected zone.
 - Arc welding
 - MIG welding
 - Laser beam welding
 - Submerged arc welding(A) 3-4-2-1 (B) 4-3-2-1 (C) 3-2-4-1 (D) 1-4-2-3
- For an ideal gas, the value of the Joule-Thomson coefficient is
(A) Zero (B) Negative (C) Positive (D) Undetermined
- Which one of the following statements about a phase diagram is INCORRECT?
(A) Solid solubility limits are depicted by it
(B) It indicates the temperature at which different phases start to melt
(C) It gives information on transformation rates
(D) Relative amount of different phases can be found under given equilibrium conditions
- The crystal structure of γ iron (austenite phase) is
(A) BCC (B) BCT (C) FCC (D) HCP
- In Materials Requirement Planning, if the inventory holding cost is very high and the setup cost is zero, which one of the following lot sizing approaches should be used?
(A) Base Stock Level (B) Lot-for-Lot
(C) Economic Order Quantity (D) Fixed Period Quantity, for 2 periods
- Froude number is the ratio of
(A) inertia forces to gravity forces (B) buoyancy forces to inertia forces
(C) buoyancy forces to viscous forces (D) inertia forces to viscous force
- A bolt head has to be made at the end of a rod of diameter $d = 12$ mm by localized forging (upsetting) operation. The length of the unsupported portion of the rod is 40 mm. To avoid buckling of the rod, a closed forging operation has to be performed with a maximum die diameter of _____ mm.
(A) 18 (B) 22 (C) 23 (D) 19
- The process, that uses a tapered horn to amplify and focus the mechanical energy for machining of glass, is

- (A) electrical discharge machining (B) abrasive jet machining
 (C) electrochemical machining (D) ultrasonic machining
10. For an air-standard Diesel cycle,
 (A) heat addition is at constant pressure and heat rejection is at constant volume
 (B) heat addition is at constant volume and heat rejection is at constant pressure
 (C) heat addition is at constant pressure and heat rejection is at constant pressure
 (D) heat addition is at constant volume and heat rejection is at constant volume
11. A perfect gas at 27°C is heated at constant pressure till its volume is double. The final temperature is
 (A) 54°C (B) 327°C (C) 108°C (D) 654°C
12. The door of a running refrigerator inside a room was left open. Which of the following statements is correct?
 (A) The room will be cooled to the temperature inside the refrigerator.
 (B) The room will be cooled very slightly.
 (C) The room will be gradually warmed up.
 (D) The temperature of the air in room will remain unaffected.
13. The efficiency of Diesel cycle with decrease in cut off
 (A) increases (B) decreases
 (C) remains unaffected (D) first increases and then decreases
14. The following cycle is used for air craft refrigeration
 (A) Brayton cycle (B) Joule cycle
 (C) Bell Coleman cycle (D) Reversed Brayton cycle
15. If the compression ratio of an engine working on Otto cycle is increased from 5 to 7, the % age increase in efficiency will be
 (A) 2% (B) 14% (C) 8% (D) 4%
16. In loop scavenging, the top of the piston is
 (A) flat (B) contoured (C) slanted (D) depressed
17. On Mollier chart, free expansion, or throttling process from high pressure to atmosphere is represented by
 (A) horizontal straight line (B) vertical straight line
 (C) straight inclined line (D) curved line
18. The latent heat of steam _____ with increase of pressure
 (A) remains same (B) increases
 (C) decreases (D) behaves unpredictably
19. The balanced draft furnace is one using
 (A) induced draft fan and chimney (B) induced draft fan and forced draft fan
 (C) forced draft fan and chimney (D) any one of the above

20. The change in internal energy in steam engines equals to
 (A) work done during the rankine cycle (B) work done during compression
 (C) work done during adiabatic expansion (D) change in enthalpy
21. In multistage compressor, the isothermal compression is achieved by
 (A) employing intercooler
 (B) by constantly cooling the cylinder
 (C) by running compressor at very slow speed
 (D) by insulating the cylinder
22. Gas turbine works on
 (A) Brayton cycle (B) Carnot cycle (C) Rankine cycle (D) Erricsson cycle
23. Emissivity of a white polished body in comparison to a black body is
 (A) higher (B) lower
 (C) same (D) depends upon the shape of body
24. In heat exchangers, degree of approach is defined as the difference between temperatures of
 (A) cold water inlet and outlet (B) hot medium inlet and outlet
 (C) hot medium outlet and cold water inlet (D) hot medium outlet and cold water outlet
25. Ammonia absorption refrigeration cycle requires
 (A) very little work input
 (B) maximum work input
 (C) nearly same work input as for vapour compression cycle
 (D) zero work input
26. The brake shoes are curved to conform to the inner diameter of the
 (A) Tyre (B) Wheel (C) Pedal (D) Brake drum
27. The simplex method is the basic method for
 (A) value analysis (B) operation research
 (C) linear programming (D) model analysis
28. Queuing theory is used for
 (A) inventory problems (B) traffic congestion studies
 (C) job shop scheduling (D) all of these

29. Multistage centrifugal pumps are used to obtain
 (A) high discharge (B) high head
 (C) pumping of viscous fluids (D) high head and high discharge
30. In involute gears, the pressure angle
 (A) Dependent on the size of teeth (B) Dependent on the size of gears
 (C) Always constant (D) Always variable
31. The mean kinetic energy of a flywheel is equal to
 (A) $I\omega^2$ (B) $\frac{I\omega^2}{2g}$ (C) $\frac{I\omega^2}{2}$ (D) $\frac{I\omega^2}{4}$
32. The boundary conditions for a rod with circular cross-section, under torsional vibration, are changed from fixed-free to fixed-fixed. The fundamental natural frequency of the fixed-fixed rod is k times that of fixed-free rod. The value of k is
 (A) 1.5 (B) p (C) 2.0 (D) 0.5
33. The clearance angle is provided on the tools with a view to
 (A) Strengthen the tool (B) Shear off the metal
 (C) Facilitate easy flow of chips (D) Prevent the tool from rubbing on workpiece
34. A rectangular hole of size 100 mm×50 mm is to be made on a 5 mm thick sheet of steel having ultimate tensile strength and shear strength of 500 MPa and 300 MPa, respectively. The hole is made by punching process. Neglecting the effect of clearance, the punching force (in kN) is
 (A) 300 (B) 450 (C) 600 (D) 750
35. In a rolling process, the state of stress of the material undergoing deformation is
 (A) Pure compression (B) Pure shear
 (C) Compression and shear (D) Tension and shear
36. In a casting process, a vertical channel through which molten metal flows downward from pouring basin to runner for reaching the mold cavity is called
 (A) sprue (B) pin hole (C) riser (D) blister
37. During normalizing process of steel, the specimen is heated
 (A) Between the upper and lower critical temperature and cooled in still air
 (B) Above the upper critical temperature and cooled in furnace
 (C) Above the upper critical temperature and cooled in still air
 (D) Between the upper and lower critical temperature and cooled in furnace

38. A link must be a
(A) Rigid body (B) Resistant body
(C) Rigid as well as resistant body (D) None of these
39. In a slider crank chain, the numbers of possible inversions are
(A) Three (B) Four (C) Five (D) Six
40. The type of threads used to transmit power in one direction only is
(A) Acme (B) Trapezoidal (C) Buttress (D) V thread
41. The maximum shear stress theory is used for
(A) brittle materials (B) ductile materials
(C) plastic materials (D) non-ferrous materials
42. Soderberg relation is based on _____ of the material whereas all other failure relation for dynamic loading are based on ultimate strength of the material
(A) elastic strength (B) yield strength
(C) shear strength (D) ultimate strength
43. Cyaniding is the process of
(A) dipping steel in cyanide bath
(B) reacting steel surface with cyanide salts
(C) adding carbon and nitrogen by heat treatment of steel to increase its surface hardness
(D) obtaining cyanide salts
44. As the shear angle increases, the plastic deformation of chip
(A) Increases (B) Decreases (C) Remains same (D) None of these
45. Cutting forces at the cutting tool can be measured by
(A) A dynamometer (B) A viscosity meter (C) A sine bar (D) A combination set
46. Plastic bottles are manufactured using the process of
(A) blow moulding (B) injection moulding
(C) atomizing (D) die casting
47. In a rolling process, the state of stress of the material undergoing deformation is
(A) pure compression (B) pure shear
(C) compression and shear (D) tension and shear

48. The process that improves the machinability of steels, but lowers the hardness and tensile strength is
(A) normalizing (B) annealing (C) tempering (D) hardening
49. When the front wheels are not parallel to each other and moved further away at the top it is termed as
(A) positive camber (B) negative camber
(C) roll out (D) roll in
50. For spur gear manufacturing, angle between the hob's spindle axis and the workpiece's spindle axis should be equal to:-
(A) (helix angle of the hob)/2 (B) 2*(helix angle of the hob)
(C) (helix angle of the hob) (D) (helix angle of the hob)2

x-x-x

(ROUGH WORK)

Biotechnology Engineering(Ph.D.)

1. Which of the following statements is not true for correlation coefficient?
 - (A) A degree of relationship between two sets of scores
 - (B) It can vary between -1.00 and +1.00
 - (C) The stronger the relation between variables, value will be closer to zero
 - (D) The stronger the relation between variables, value will be closer to -1.00 and +1.00
2. Which of the following statements is true for Patents?
 - (A) It gives an inventor the right for a limited period to stop others from making, using or selling an invention.
 - (B) It gives anyone the right for a limited period to stop others from making, using or selling an invention.
 - (C) It gives an inventor the right for a unlimited period to stop others from making, using or selling an invention.
 - (D) It gives anyone the right for a unlimited period to stop others from making, using or selling an invention.
3. All of the following statements are true for Good Laboratory Practice, except one, identify the false statement;
 - (A) The facility must be of suitable size and construction to meet the requirements of the study
 - (B) The facility must maintain a protocol of standard operation procedure
 - (C) Laboratory Personnel must exercise health precautions
 - (D) Quality assurance is not necessary in this practice procedure
4. Which one of the following best describes the Trademark;
 - (A) It is a sign that can distinguish the goods only of one trader from those of another.
 - (B) It is a sign that can distinguish the goods and services of one trader from those of another.
 - (C) It is a document that can distinguish the goods only of one trader from those of another.
 - (D) It is a document that can distinguish the goods and services of one trader from those of another.
5. A series having values 2, 4, 8, 11, 5, 6, what is the value of mean and median, respectively;
 - (A) 6 and 5.5
 - (B) 6 and 11
 - (C) 6 and 2
 - (D) 6 and 9.5
6. Patents can be of all the following types, except one, identify the incorrect answer;
 - (A) Utility Patents
 - (B) Design Patents
 - (C) Plant Patents
 - (D) Gene Patents
7. In a study involving group of individuals, arranging the data from heaviest to lightest represents which of the properties of measurements;
 - (A) Magnitude
 - (B) Identity
 - (C) Ratio
 - (D) Intervals
8. In a survey questionnaire for a research proposal, when respondents are given choice to formulate their own responses, this will be termed as;

- (A) Open-ended questions (B) Closed -ended questions
(C) Partially open-ended questions (D) Convenience ended questions
9. A Statistical method that uses arrays allowing a maximum number of main effects to be estimated in an unbiased fashion with a minimum number of experimental runs is represented as;
(A) Two sided ANOVA (B) Wilcoxon method
(C) Taguchi process (D) Paired Student's T-Test
10. The term *ibid* is commonly used in the bibliography/scholarly articles represent which of the following;
(A) It refers to citation or reference having more than three authors in bibliography
(B) It refers to citation or reference for a source that was cited in the preceding citation
(C) It refers to citation or reference of a journal that has been discontinued
(D) It refers to citation or reference having highest citation score in that year
11. Which of the following is the correct representation, if the distribution of scores is Standard normal in a dataset;
(A) It will be with a mean of 1 and a standard deviation of 1
(B) It will be with a mean of 1 and a standard deviation of 0
(C) It will be with a mean of 0 and a standard deviation of 0
(D) It will be with a mean of 0 and a standard deviation of 1
12. A graphical figure representing the correlation coefficient relationship between two variables is termed as;
(A) Scatterplot (B) Normal curve
(C) Normal distribution (D) Regression analysis
13. In a mixed population of cells, the cells can be separated based on all of the following criteria, except one. Identify the incorrect answer;
(A) Cell size (B) Cell density
(C) Cell surface antigens (D) Cell source tissue
14. Safety regulations and guidelines for equipment's and chemicals are provided by;
(A) Occupational safety and health administration
(B) Occupational safety and Public administration
(C) Organizational safety and health administration
(D) Organizational safety and Public administration
15. All the following mentioned items or process can qualify as potential safety hazard in tissue culture laboratory, except one. Identify the incorrect answer;
(A) Broken glass (B) Radioisotopes (C) Ovens (D) Laboratory aprons
16. Safety measures from β and γ emitters can be obtained by the methods listed below, except one, identify the incorrect option;
(A) Working behind a 2-mm thick lead shield.
(B) Storing the isotope in a lead pot.
(C) Perpex screen 3mm in thickness.

- (D) Working in a cell culture laboratory.
17. For working with tissue samples carrying human pathogens, which type of biosafety cabinets will be most aptly suitable;
- (A) Open bench with vertical laminar flow hood
 (B) Open bench with horizontal laminar flow hood
 (C) Class II laminar flow hood
 (D) Class III laminar flow hood
18. In order to purify a protein using IMAC (Immobilized metal affinity Chromatography columns), The fusion protein will have sequence of specialised set of amino acid residues tagged to it, Which of the following is the correct option of amino acids in the following answers;
- (A) A sequence of Histidine residues (B) A sequence of Proline residues
 (C) A sequence of Glutamic acid residues (D) A sequence of Leucine residues
19. In Human Genome project a research program was initiated to take care of ethics in the project, The name of this program was;
- (A) Ethical Legal Social Issues (B) Ethical Human Genome Project
 (C) Laws of Human Genome Project (D) Rules of Human Genome Project
20. During the process of transgenic animal's creation, which of the following statements is not true, Identify the false statement;
- (A) Concern for well-being of animal should be guaranteed
 (B) Such animals can be kept with wild type animals
 (C) Experimental protocol on animals must be evaluated by competent authorities
 (D) The use of organs from such animals should be met by ethical regulations
21. The information or data that is not already incorporated into publication and is not essential to understanding your manuscript, but it provides background information or reinforces the main points of the manuscript, is provided as which of the following;
- (A) Figure (B) Table (C) Supplementary (D) Acknowledgement
22. The relationship between Mean, Median and Mode in a data with symmetrical frequency distribution will be defined by which one of the following terms;
- (A) Mean= Median=Mode (B) Mean> Median=Mode
 (C) Mean= Median>Mode (D) Mean> Median>Mode
23. The legal right of intangible intellectual properties is termed as;
- (A) Intangible property right (B) Intellectual property right
 (C) Intangible legal right (D) Intellectual legal right
24. An international treaty that facilitates an applicant to file a single patent application specifying the countries in which the patent to be filed is;
- (A) Patent Cooperation Treaty (B) Patent Collaboration Treaty
 (C) International Patent Corporation Treaty(D) International Patent Collaboration Treaty
25. Which of the following committees is a statutory committee formulating guidelines for dealing with prevention of cruelty to animals, specifically the ones used for experimental purposes? Identify the correct answer.

- (A) CPCSEA (B) CPCEA (C) IAEC (D) IAECPC

26. If the primary antibody is generated in rabbit, then all the following species, except, one of the following could not used for generating secondary antibody against this primary antibody;

- (A) Goat (B) Dog (C) Rabbit (D) Mouse

27. During nick translation which of the following activity is observed and which enzyme is responsible for this process?

- (A) Movement of single strand break in DNA catalyzed by DNA Polymerase-I enzyme
(B) Movement of single strand break in DNA catalyzed by DNA Polymerase-II enzyme
(C) Movement of single strand break in DNA catalyzed by DNA Polymerase-III enzyme
(D) Movement of single strand break in DNA catalyzed by RNA Polymerase

enzyme

28. Two dimensional gel electrophoresis technique is a powerful method of proteomic analysis, that separates the molecules based on which one of the following way;

- (A) Isoelectric focussing in one direction followed by Native polyacrylamide gel electrophoresis in reverse direction
(B) Native polyacrylamide gel electrophoresis first in one direction in followed by isoelectric focussing in other direction
(C) SDS polyacrylamide gel electrophoresis first in one direction followed by isoelectric focussing at right angle to first direction
(D) Isoelectric focussing first in one dimension to be followed by SDS polyacrylamide gel electrophoresis in second dimension

29. Employing Klenow fragment, researcher while processing a recombinant DNA molecule erroneously denatured this protein in the sample, according to you which of the following activity is lost in this sample;

- (A) 5' to 3' polymerase and 5' to 3' exonuclease activity
(B) 3' to 5' polymerase and 3' to 5' exonuclease activity
(C) 5' to 3' polymerase and 3' to 5' exonuclease activity
(D) 3' to 5' polymerase and 5' to 3' exonuclease activity

30. During animal cells subculture, Trypsin digestion is stopped by which of the following method;

- (A) By incubating the culture at 25⁰C
(B) By incubating the culture at 37⁰C
(C) By addition of media containing Albumin
(D) By addition of media containing serum

31. During generation of transgenic mouse, the pseudopregnacy refers to which of the following procedure;

- (A) Selective breeding of normal female mouse with normal male mouse
 (B) Selective breeding of normal female mouse with vasectomized mouse
 (C) Selective breeding of ovariectomized mouse with normal male mouse
 (D) Selective breeding of ovariectomized female mouse and vasectomized mouse
32. The industrial level alcoholic fermentation is brought about by which of the following microorganism;
 (A) *Saccharomyces cerevisiae* (B) *Lactobacillus*
 (C) *Pseudomonas* species (D) *Escherichia coli*
33. Which one of the following represents the downstream process in biotechnology industry;
 (A) Effluent treatment (B) Cell selection
 (C) Media preparation and sterilization (D) Cell screening
34. Adenosine Deaminase (ADA) deficiency that causes severe immune disorder was chosen for the first human gene therapy for which of the following reason;
 (A) It existed in very small number of individuals
 (B) It is the result of mutation in only one gene
 (C) All of the mutations in ADA genes were silent mutation
 (D) This gene did not show any immunogenic response
35. Variable number tandem repeats (VNTR's) can be used to identify two individuals, employing which of the following technique;
 (A) SDS-PAGE (B) Ion exchange chromatography
 (C) Restriction fragment length polymorphism (D) Spectro-fluorimetry analysis
36. In order to be an effective antigen for raising the antibodies in rabbit, a newly synthesized protein "X" would work best with which one of the following;
 (A) Injection of Protein "X" mixed with gelatin followed by injection of sundai virus
 (B) Injection of protein "X" mixed with gelatin followed by injection of Protein "X"
 (C) Injection of protein "X" mixed with sundai virus and inject in rabbit
 (D) Injection of Protein "X" mixed with Freund's complete adjuvant followed by Freund's incomplete adjuvant
37. Leucine dehydrogenase is recovered from disrupted *Bacillus cereus* cells using an aqueous two-phase polyethylene glycol-salt system. The upper to lower layer phase volume ratio is 3.6 and the enzyme partition coefficient is 2.5. The maximum possible enzyme recovery is
 (A) 80% (B) 85% (C) 90% (D) 95%
38. During the process of protein denaturation, all the following events, except one, would not happen ;
 (A) Loss of primary structure
 (B) Randomization of Conformation
 (C) Unfolding of structure of protein of interest
 (D) Loss of three- dimensional structure

39. Why *B. thuringiensis* toxin is not toxic to humans despite being ingested ;
- Because it remains a protoxin and gets destroyed by acidic environment of Stomach
 - Human liver metabolizes it to non-toxic product
 - Human body lacks its receptors for its absorption
 - Human buccal enzymes destroys it in mouth
40. During generation of a stable animal cell line, the death curve/kill curve is generally prepared to perform which one of the following;
- To optimise the dose of antibiotic required to kill 100% untransfected cells
 - To optimise the dose of antibiotic required to kill 100% transfected cells.
 - To optimise the ratio of receptors and to antibiotic ligand
 - To optimise the number of plasmids required to transfect a cell line
41. The cycle number 3rd is the most important PCR cycle as during this cycle which one of the following happens;
- First time the PCR proceed without template
 - First time the ratio of dNTP to Mg²⁺ gets equal
 - First time expected size fragment gets amplified
 - First time the template gets extended
42. Which of the following truly represents restriction endonuclease type -II action?
- Require ATP for catalysing endonucleolytic action
 - Cleave both the DNA strands within the recognition sequence
 - Cleave about 25 bp from the recognition sequence itself
 - These are the first ever identified ribozymes
43. A fermentation broth ($\rho = 1 \text{ g/cm}^3$) is agitated in a tank using a propeller of diameter 1 m. The power required for a stirrer speed of 2s^{-1} is _____. (Use $N_p = 0.35$).
- 2.8 kW
 - 2800 kW
 - 11.2 kW
 - 11200 kW
44. The first humanized antibodies were the chimeras of which one of the following species;
- Guinea pig-Human Chimera
 - Pig -Human Chimera
 - Rabbit-Human Chimera
 - Mouse -Human Chimera
45. 50 moles/min of C_4H_8 is fed to a reactor where it is oxidized to produce carbon dioxide and water. If only 50% of the feed reacts, the amount of water formed is;
- 25 moles/min
 - 50 moles/min
 - 75 moles/min
 - 100 moles/min
46. You isolated a novel transcription factor, which of the following methodology would you use to show that this protein binds to the promoter region of Gene "X";
- Next generation sequencing
 - Northern blotting
 - DNA foot printing
 - DNA Barcoding
47. In order to identify homologous sequences to a query sequence from a database, which tool can be used
- BLAST
 - BLOSUM
 - PAM
 - MEGA

48. Type IV or Delayed type hypersensitivity reactions are mediated by which of the cellular Processes;
- (A) IgE mediated reactions (B) IgM mediated reactions
(C) IgG mediated reactions (D) Cell mediated reactions
49. In all isotypes of immunoglobulin's two types of chains are linked to one another in a pair by which of the following types of bonds;
- (A) Vander-waals interactions (B) Disulfide bonds
(C) Ionic interactions (D) Hydrophobic interactions
50. The classical method to raise monoclonal antibodies employ one of the following enzyme in the selection process, which of these enzyme is being used.;
- (A) Hypoxanthine-Guanine phosphoribosyl transferase
(B) Guanosine-Xanthine phosphoribosyl transferase
(C) Hypoxanthine-Guanosine phosphoribosyl transferase
(D) Guanine-Xanthosine phosphoribosyl transferase

x-x-x

(ROUGH WORK)

Chemical Engineering(Ph.D)

1. Which of the following research designs is most suitable for testing cause-and-effect relationships?
(A) Descriptive research (B) Exploratory research
(C) Experimental research (D) Correlational research
2. In a research study, the variable that is manipulated by the researcher is known as the
(A) Dependent variable (B) Independent variable
(C) Confounding variable (D) Extraneous variable
3. Which of the following sampling techniques involves dividing the population into subgroups and then taking a random sample from each subgroup?
(A) Simple random sampling (B) Stratified random sampling
(C) Cluster sampling (D) Convenience sampling
4. Which type of data analysis involves examining the differences between groups or relationships among variables?
(A) Descriptive analysis (B) Predictive analysis
(C) Inferential analysis (D) Diagnostic analysis
5. A literature review serves the purpose of
(A) Identifying gaps in current research (B) Generating new data
(C) Collecting primary data (D) Testing hypotheses
6. A graphical representation of the distribution of data is known as a
(A) Histogram (B) Pie chart (C) Scatter plot (D) Bar graph
7. The term “research methodology” refers to
(A) Methods used in data collection and analysis
(B) Rules for writing a research report or paper
(C) Specific method of study and analysis
(D) The theoretical paradigms for data collection, analysis and interpretation
8. A hypothesis is a
(A) Tentative statement whose validity is still to be tested
(B) Supposition which is based on the past experiences
(C) Statement of fact
(D) Any false statement
9. What do you mean by synopsis of a research project?
(A) The blue print of research
(B) Extracts from the research observations
(C) A plan of the research
(D) Summary of the findings of the research
10. Which type of sampling is most appropriate for a study aiming to generalize its findings to a large population?
(A) Convenience sampling (B) Quota sampling
(C) Stratified random sampling (D) Snowball sampling

11. Which type of research design is characterized by manipulating one variable to determine its effect on another variable, while controlling for confounding variables?
(A) Descriptive research (B) Correlational research
(C) Experimental research (D) Ethnographic research
12. Which statistical technique is used to examine the relationship between multiple independent variables and a single dependent variable?
(A) Multiple regression (B) Factor analysis
(C) Path analysis (D) Discriminant analysis
13. Which type of bias occurs when participants alter their behaviour due to their awareness of being observed?
(A) Selection bias (B) Observer bias (C) Response bias (D) Hawthorne effect
14. Which of the following is a characteristic of a quasi-experimental design?
(A) Random assignment of participants to groups
(B) Manipulation of the independent variable without random assignment
(C) Lack of a control group
(D) Use of descriptive statistics only
15. What is the primary purpose of a literature review in research?
(A) To present original data
(B) To develop new research hypotheses
(C) To collect raw data for analysis
(D) To summarize and evaluate existing knowledge on a topic
16. Which of the following best describes a hypothesis?
(A) A detailed description of the research methodology
(B) A summary of the research findings
(C) A tentative statement about the relationship between variables
(D) A literature review
17. Which type of scale is used when respondents are asked to rate their agreement with a statement on a scale from 1 to 5?
(A) Nominal scale (B) Ordinal scale (C) Interval scale (D) Ratio scale
18. Which of the following best describes qualitative research?
(A) It focuses on numerical data (B) It is used to test hypotheses
(C) It explores phenomena in-depth (D) It is always conducted in a laboratory setting
19. What is the main advantage of using a longitudinal study design?
(A) It provides a snapshot of a particular moment in time
(B) It is less time-consuming
(C) It allows researchers to observe changes over time
(D) It requires fewer resources
20. In statistical analysis, what does "standard deviation" measure?
(A) The central tendency of data

- (B) The spread or dispersion of a set of data
 (C) The relationship between two variables
 (D) The difference between the highest and lowest values
21. For a first-order reaction $A \rightarrow B$ with a rate constant k , what is the half-life of the reaction?
 (A) $1/k$ (B) $\ln 2/k$ (C) $1/2k$ (D) $2/k$
22. In a batch reactor, the conversion of reactant A follows first-order kinetics. If the initial concentration of A is C_{A0} , the concentration of A at time t is given
 (A) $C_{A0}e^{-kt}$ (B) $C_{A0}(1-kt)$ (C) $C_{A0}(1-e^{-kt})$ (D) $C_{A0}[1-(kt/1+kt)]$
23. Which of the following reactors is most suitable for carrying out highly exothermic reactions to avoid hot spots?
 (A) Plug Flow Reactor (PFR) (B) Continuous Stirred Tank Reactor (CSTR)
 (C) Packed Bed Reactor (D) Fluidized Bed Reactor
24. The effectiveness factor of a catalyst pellet is a measure of:
 (A) External mass transfer resistance (B) Internal mass transfer resistance
 (C) Thermal conductivity (D) Catalytic activity
25. The angle of nip in a roll crusher is generally about:
 (A) 16° (B) 32° (C) 45° (D) 65°
26. In a feedback control system, which of the following is used to measure the output variable?
 (A) Sensor (B) Controller (C) Actuator (D) Transmitter
27. Which of the following controllers has an offset in steady-state response?
 (A) P controller (B) PI controller (C) PD controller (D) PID controller
28. A thermocouple measures temperature based on the:
 (A) Seebeck effect (B) Peltier effect (C) Thomson effect (D) Joule effect
29. A strain gauge measures:
 (A) Temperature changes (B) Pressure changes
 (C) Deformation in a material (D) Humidity changes
30. Which of the following statements is true for the Prandtl number?
 (A) It is the ratio of thermal diffusivity to momentum diffusivity
 (B) It is the ratio of momentum diffusivity to thermal diffusivity
 (C) It is the ratio of heat capacity to thermal conductivity
 (D) It is the ratio of viscosity to thermal conductivity
31. The Lang factor is used in estimating:
 (A) Fixed capital investment (B) Operating cost
 (C) Raw material cost (D) Labor cost
32. The break-even point in a chemical plant operation is defined as the point where
 (A) Total revenue equals total cost
 (B) Total variable cost equals total fixed cost

- (C) Total revenue equals total variable cost
(D) Total profit equals total fixed cost
33. The transfer function of a first-order system is characterized by
(A) A single zero (B) A single pole
(C) Multiple poles (D) Multiple zeros
34. The Ziegler-Nichols method is used for:
(A) Calibrating sensors (B) Designing control valves
(C) Tuning PID controllers (D) Measuring process variables
35. In High-Performance Liquid Chromatography (HPLC), the stationary phase is typically
(A) An inert gas (B) A liquid solvent
(C) A solid adsorbent (D) A semi-permeable membrane
36. In process safety, a "safety valve" is used to
(A) Control the pressure within a vessel (B) Measure the temperature of a process
(C) Maintain a constant flow rate (D) Provide an emergency release of pressure
37. Fick's first law of diffusion states that the flux of a species is proportional to:
(A) The concentration gradient (B) The temperature gradient
(C) The pressure gradient (D) The velocity gradient
38. Which dimensionless number in mass transfer is analogous to the Schmidt number in heat transfer?
(A) Prandtl number (B) Reynolds number
(C) Nusselt number (D) Peclet number
39. In the Nyquist plot, a system is stable if the plot
(A) Encircles the point (-1,0) (B) Does not encircle the point (-1,0)
(C) Passes through the origin (D) Encircles the point (1,0)
40. The phase margin of a system is the
(A) Additional phase lag required to bring the system to the verge of instability
(B) Additional phase lead required to bring the system to the verge of instability
(C) Phase difference between the input and output
(D) Frequency at which the gain is maximum
41. In the contact process for sulphuric acid production, the catalyst used is
(A) Vanadium pentoxide (V_2O_5) (B) Platinum (Pt)
(C) Iron oxide (Fe_2O_3) (D) Nickel (Ni)
42. The process of hydrogenation of oils converts
(A) Oils to waxes (B) Saturated fats to unsaturated fats
(C) Unsaturated fats to saturated fats (D) Waxes to oils
43. The relative humidity is defined as
(A) The ratio of the actual vapor pressure to the saturation vapor pressure
(B) The ratio of the actual humidity to the absolute humidity

- (C) The difference between the actual humidity and the absolute humidity
(D) The mass of water vapor per unit volume of air
44. The term "wet-bulb temperature" is used in humidity calculations to indicate
(A) The temperature at which air is saturated with moisture
(B) The lowest temperature that can be reached by evaporative cooling
(C) The temperature at which water condenses
(D) The temperature at which air is completely dry
45. Anisotropic materials exhibit
(A) The same properties in all directions (B) Different properties in different directions
(C) No properties (D) Random properties
46. The main purpose of a cyclone separator in air pollution control is to
(A) Capture gaseous pollutants (B) Capture particulate matter
(C) Remove odors (D) Neutralize acidic gases
47. The term "dead time" in process control refers to:
(A) The time delay between input and output
(B) The time taken for the system to reach steady state
(C) The time taken for the process to initiate
(D) The time taken for the feedback loop to close
48. In wastewater treatment, the activated sludge process involves
(A) The use of aerobic bacteria to decompose organic matter
(B) The use of anaerobic bacteria to decompose organic matter
(C) Physical filtration of solids
(D) Chemical precipitation of contaminants
49. The Ziegler-Natta catalyst is used in the production of
(A) Polyethylene (B) Polyvinyl chloride
(C) Polystyrene (D) Polyethylene terephthalate
50. The glass transition temperature of a polymer is
(A) The temperature at which the polymer becomes brittle
(B) The temperature at which the polymer melts
(C) The temperature at which the polymer decomposes
(D) The temperature at which the polymer crystallizes

x-x-x

(ROUGH WORK)

Food Technology(Ph.D)

1. How does the addition of lemon juice prevent the browning of cut fruits and vegetables?
(A) It dehydrates the fruit surface
(B) It changes the pH and inhibits the action of enzymes
(C) It enhances the action of oxidizing enzyme
(D) It adds moisture to the surface
2. Pectin is present in the form of _____ in immature fruits.
(A) Protopectin (B) Pectin (C) Pectic acid (D) Cellulose
3. Which of the following is a water-soluble pigment?
(A) Chlorophyll (B) Anthocyanin (C) Carotenoids (D) Xanthophylls
4. Which of the following fruits/vegetable is used for the preparation of sauerkraut?
(A) Cabbage (B) Turnip (C) Cucumber (D) Carrot
5. Which of the following is an example of pome fruit?
(A) Watermelon (B) Apple (C) Banana (D) Amla
6. Which of the following is used as an antioxidant to prevent browning in cut fruits?
(A) Lactic acid (B) Tartaric acid (C) Ascorbic acid (D) Fumaric acid
7. Which of the following statements is correct?
(A) Marmalade is a mixture of fruit in which nuts and raisins are added.
(B) Marmalade is a clear fruit jelly.
(C) Marmalade contains whole fruit.
(D) Marmalade is a fruit jelly in which slices of fruit or peel are suspended.
8. The finished jam should contain _____ invert sugar to avoid the crystallization of cane sugar during storage.
(A) 30-50% (B) 15-40% (C) 40-80% (D) 10-20%
9. Which of the following factors influence the color and clarity of tea during brewing?
(A) Temperature and brewing time (B) Water hardness and pH
(C) Temperature and pH (D) Size of tea leaf
10. Which instrument is used to estimate the concentration of total soluble solids in juice?
(A) Salinometer (B) Scoville scale (C) Lactometer (D) Refractometer
11. Identify the correct sequence for the parboiling of rice.
(A) Steaming, steeping, and Drying (B) Steeping, steaming, and drying
(C) Drying, steeping, and steaming (D) Steaming, Drying, and steeping
12. Which of the following characteristics is commonly associated with soft wheat?
(A) Low carbohydrate content (B) High gluten content
(C) Low gluten content (D) High protein content

13. What is the main function of scutellum in grain?
 (A) It allows the transport of stored food reserve in the endosperm to the embryo when grain germinates
 (B) To protect the seed
 (C) To facilitate the seed disposal
 (D) To store water
14. Gluten is the principal functional protein present in _____
 (A) Rice (B) Wheat (C) Corn (D) Oats
15. Wheat germ oil is rich in _____
 (A) Vitamin A (B) Vitamin E (C) Vitamin C (D) Vitamin D
16. Which type of flour is suitable for cakes?
 (A) Hard wheat flour (B) Semi-hard wheat flour
 (C) Durum wheat flour (D) Soft wheat flour
17. Which chemical is used for the bleaching of wheat flour?
 (A) Benzoyl peroxide (B) Acetone
 (C) Carbon dioxide (D) Sulphate
18. Rice is deficient in which of the following amino acids?
 (A) Lysine and threonine (B) Methionine and cysteine
 (C) Methionine and lysine (D) Cysteine and threonine
19. Sake is an alcoholic beverage prepared from fermented _____.
 (A) Wheat (B) Rice (C) Barley (D) Rye
20. Rice is enriched with which of the following vitamins that can reduce the incidence of beri-beri?
 (A) Vitamin A (B) Vitamin B2 (C) Vitamin B1 (D) Vitamin B3
21. Zein protein is primarily found in _____
 (A) Wheat (B) Corn (C) Rice (D) Soyabean
22. Which fungus is known as bread mold?
 (A) *Penicillium* (B) *Mucor* (C) *Aspergillus* (D) *Rhizopus*
23. Which microorganism is responsible for the production of aflatoxins?
 (A) *Aspergillus flavus* (B) *Aspergillus oryzae*
 (C) *Penicillium roqueforti* (D) *Staphylococcus aureus*
24. Which preservative is mostly used in bakery industry?
 (A) Propionates (B) Benzoates (C) Sorbates (D) Sulfites
25. Which gas is formed in *Thermophilic anaerobic* (TA) spoilage?
 (A) Hydrogen sulphide (B) Carbon monoxide
 (C) Nitrogen (D) Hydrogen

26. Which one of the following microorganisms is killed during the pasteurization of eggs?
 (A) *Salmonella* (B) *Streptococcus* (C) *Staphylococcus* (D) *Micrococcus*
27. Ale is fermented by _____.
 (A) *Saccharomyces cerevisiae* (B) *Saccharomyces uvarum*
 (C) *Aspergillus niger* (D) *Lactobacillus diastaticus*
28. Sorbic acid is most effected against _____.
 (A) Bacteria (B) Yeast and molds (C) Viruses (D) Insects
29. What is the moisture content of Intermediate moisture foods?
 (A) 15-40% (B) 55-75% (C) 10-12% (D) 60-80%
30. Corrective actions in HACCP are necessary when _____.
 (A) Critical limits are exceeded
 (B) Monitoring shows everything is under control
 (C) Hazards are identified
 (D) Documentation is complete
31. Which microorganism is required for the production of amylase?
 (A) *Bacillus subtilis* (B) *Candida pulcherrima*
 (C) *Geotrichum candidum* (D) *Saccharomyces cerevisiae*
32. What is the significance of homogenization in milk processing?
 (A) To increase milk shelf life
 (B) To kill microorganisms
 (C) To break down fat globules for a uniform consistency
 (D) To reduce lactose content
33. What is the standard amount of fat and moisture content in butter?
 (A) 80% fat and 12-16% moisture (B) 70% fat and 8-10% moisture
 (C) 60% fat and 22-25% moisture (D) 50% fat and 8-10% moisture
34. Which microorganism is responsible for the formation of swiss holes in cheese?
 (A) *Penicillium roqueforti* (B) *Propionibacterium shermanii*
 (C) *Penicillium camemberti* (D) *Streptococcus*
35. Which process is employed for the removal of bacteria from milk?
 (A) Homogenization (B) Bactofugation (C) Churning (D) Standardization
36. Which pigment is responsible for the characteristic color of the whey?
 (A) Riboflavin (B) Anthocyanin (C) Myoglobin (D) Xanthophyll
37. Which category applies to Cheddar cheese?
 (A) Soft cheese (B) Hard cheese (C) Liquid cheese (D) Very hard cheese

38. Which component is more in colostrum than normal milk?
(A) Protein (B) Fat (C) Vitamin K (D) Carbohydrates
39. In the context of milk processing, what does the term 'Standardization' refer to _____.
(A) The addition of vitamins and minerals (B) The removal of water content
(C) The adjustment of fat content (D) The homogenization of milk proteins
40. What is the purpose of ultra-high temperature (UHT) processing in milk production?
(A) To improve the taste
(B) To increase shelf life without refrigeration
(C) To enhance the nutritional content
(D) To reduce the fat content
41. What is the main stabilizer used in commercial ice cream production to prevent ice crystal formation?
(A) Gelatin (B) Carrageenan (C) Xanthan gum (D) Guar gum
42. Which compound is responsible for the flavor of butter?
(A) Diacetyl (B) Butyric acid (C) Casein (D) Lactose
43. The most frequently occurring monomer of a carbohydrate is _____.
(A) Maltose (B) Lactose (C) Glucose (D) Galactose
44. In enzyme kinetics, Michaelis constant is _____.
(A) The substrate concentration at which velocity of reaction is maximum
(B) The substrate concentration at which velocity of reaction is minimum
(C) The substrate concentration at which velocity of reaction is half of maximum velocity
(D) The substrate concentration at which velocity of reaction is one third of maximum velocity
45. The starch that passes through the small intestine undigested is referred to as _____.
(A) Modified starch (B) Gelatinized starch
(C) Resistant starch (D) Dextrified starch
46. Strecker degradation can be seen during _____.
(A) Protein biosynthesis (B) Maillard reaction
(C) Nucleotide metabolism (D) Caramelization
47. Which of the following is a color fixative agents used in meat?
(A) Sodium nitrite (B) Common salt
(C) Sugar (D) Spices

48. The term DFD in meat technology stands for _____.
- (A) Dry, Firm, Dry (B) Dark, Firm, Dry
(C) Dark, Fermented, Dry (D) Dry, Fermented, Dry
49. Which of the following statements is correct regarding water content of egg white?
- (A) Less than egg yolk (B) More than egg yolk
(C) Same as egg yolk (D) No water is present
50. The juiciness of meat is dependent on _____.
- (A) Amount of protein in meat
(B) Amount of connective tissue in meat
(C) Amount of fat and water holding capacity of meat
(D) Amount of carbohydrates present in meat

x-x-x

(ROUGH WORK)

Industrial Chemistry(Ph.D)

1. Which of the following is the goal of evaluation research?
(A) Situation-based decision making (B) People-based decision making
(C) Data-based decision making (D) Trend-based decision making
2. Which of the following is the first step in a research process?
(A) Formulating research problem (B) Selecting a topic
(C) Development of a hypothesis (D) None of these
3. In which of the following cases, the formation of hypothesis may not be necessary?
(A) Investigative historical studies (B) Experimental studies
(C) Normative studies (D) Survey studies
4. What do you mean by an assumption?
(A) It is a framework in which research work has to be done
(B) It simplifies the logical process of arriving at the solution
(C) It is a restrictive condition
(D) A vague statement
5. In qualitative research, the method of data collection that involves intensive interviews with individuals is known as
(A) Case study (B) Survey (C) Focus group (D) Ethnography
6. A type of research where the researcher observes and records behavior without manipulating any variables is called
(A) Experimental research (B) Observational research
(C) Survey research (D) Action research
7. The ethical principle that requires researchers to fully inform participants about the nature of the study and obtain their consent is called
(A) Beneficence (B) Confidentiality (C) Informed consent (D) Justice
8. In statistical hypothesis testing, the probability of rejecting the null hypothesis when it is actually true is known as
(A) Type I error (B) Type II error (C) Significance level (D) Power
9. Which of the following is a non-probability sampling method?
(A) Simple random sampling (B) Stratified sampling
(C) Systematic sampling (D) Purposive sampling
10. The measure of central tendency that is most affected by extreme values is
(A) Mean (B) Median (C) Mode (D) Range
11. In a research report, the section that describes how the research was conducted is called
(A) Introduction (B) Literature review (C) Methodology (D) Discussion
12. A research design that collects data from the same subjects at multiple points in time is known as
(A) Cross-sectional study (B) Longitudinal study
(C) Case-control study (D) Experimental study

13. Which statistical test would you use to compare the means of three or more groups?
(A) t-test (B) Chi-square test (C) ANOVA (D) Regression analysis
14. The Hawthorne effect refers to
(A) The influence of the researcher on the outcome of the study
(B) Participants changing their behaviour because they know they are being observed
(C) The impact of confounding variables on the study results
(D) The increase in measurement error due to participant fatigue
15. A key advantage of using secondary data in research is
(A) It is always more accurate than primary data
(B) It eliminates the need for ethical approval
(C) It reduces the cost and time associated with data collection
(D) It provides insights that are more relevant to the researcher's current study
16. Which of the following is a potential limitation of case study research?
(A) Lack of depth in data collection (B) High cost of conducting the study
(C) Difficulty in collecting qualitative data (D) Limited generalizability of findings
17. The primary purpose of using a pilot study is to
(A) Test the feasibility and refine the research design
(B) Collect preliminary data for hypothesis testing
(C) Conduct a comprehensive literature review
(D) Disseminate research findings to a wider audience
18. In the context of qualitative research, "thematic analysis" involves
(A) Counting the frequency of themes in the data
(B) Comparing themes across different datasets
(C) Conducting statistical tests to confirm themes
(D) Identifying and analyzing patterns or themes within qualitative data
19. What does "random sampling" ensure in research?
(A) That all participants receive the same treatment
(B) That every individual has an equal chance of being selected
(C) That the sample is small
(D) That the data is collected quickly
20. What is a "likert scale"?
(A) A measure of central tendency
(B) A ranking scale for measuring ordinal data
(C) A psychometric scale commonly used in questionnaires to measure attitudes or feelings
(D) A statistical test for comparing means
21. In a reversible chemical reaction having two reactants in equilibrium, if the concentration of the reactants are doubled, then the equilibrium constant will
(A) remain the same (B) be halved
(C) also be doubled (D) become one-fourth
22. An ideal working fluid for Rankine cycle should have not have
(A) reasonable saturation pressure at maximum temperature of the cycle

- (B) steep saturated vapour line
 (C) saturation pressure higher than atmospheric at minimum temperature of the cycle
 (D) high specific heat
23. On a Mollier chart, slope of the curve representing a reversible isothermal process is equal to
 (A) $T-1/\beta$ (B) T (C) $T-\beta$ (D) $T+1/\beta$
24. For an ideal gas C_p and C_v are functions of
 (A) temperature only (B) pressure only
 (C) both temperature and pressure (D) none of the above
25. Grashoff number is defined as the ratio of the
 (A) buoyancy to inertial forces (B) inertial to viscous forces
 (C) buoyancy to surface tension forces (D) buoyancy to viscous forces
26. Absorptivity and reflectivity of a perfect black body are respectively
 (A) 1 and 0 (B) 0 and 1 (C) 1 and ∞ (D) 0 and 0.5
27. Which of the following is a common unit operation used for separating components based on boiling points?
 (A) Extraction (B) Filtration (C) Distillation (D) Crystallization
28. What is the primary function of a catalytic converter in automotive exhaust systems?
 (A) To reduce fuel consumption
 (B) To increase engine power
 (C) To convert harmful gases into less harmful emissions
 (D) To enhance engine cooling
29. What does term "Reynolds number" describe in fluid mechanics?
 (A) The ratio of inertial forces to viscous forces
 (B) The rate of heat transfer in a laminar flow
 (C) The pressure drop across a pipe
 (D) The velocity profile of a fluid
30. Which of the following is a unit operation typically used to separate solid particles from a liquid by gravitational settling?
 (A) Filtration (B) Distillation (C) Crystallization (D) Sedimentation
31. If in the gaseous phase reaction, $N_2O_4 \rightleftharpoons 2NO_2$, x is the part of N_2O_4 that dissociates, then the number of molecules at equilibrium will be
 (A) $(1+x)$ (B) $(1-x)$ (C) $(1+x)^2$ (D) $(1-x)^2$
32. The dry bulb temperature of the gas is _____ the wet bulb temperature.
 (A) less than (B) more than (C) equal to (D) none of these
33. What is the purpose of a pump in engineering processes?
 (A) To increase the pressure of a fluid
 (B) To mix two immiscible liquids
 (C) To separate components based on volatility
 (D) To heat the feed before entering the reactor

- 34. Which of the following is a common method for increasing the mass transfer rate in chemical processes?**
- (A) Decreasing the temperature (B) Increasing the reactor volume
(C) Using a catalyst (D) Agitating the mixture
- 35. Which of the following is true for an azeotropic mixture?**
- (A) It can be separated into pure components by simple distillation.
(B) It has the same composition in both liquid and vapour phases at equilibrium.
(C) It exhibits no deviation from Raoult's law.
(D) It has multiple boiling points.
- 36. In adsorption, what is BET theory used to explain?**
- (A) Monolayer adsorption (B) Langmuir adsorption isotherm
(C) Chemisorption (D) Multilayer adsorption
- 37. Which analytical technique is used to identify the composition of chemical compounds by ionizing the chemical species and sorting the ions based on their mass-to-charge ratio?**
- (A) Mass Spectrometry (MS) (B) UV-Vis Spectroscopy
(C) X-Ray Diffraction (XRD) (D) Electron Microscopy
- 38. What does CFD stand for in the context of chemical engineering simulations?**
- (A) Chemical Flow Dynamics (B) Chemical Filtration Design
(C) Compound Fluid Design (D) Computational Fluid Dynamics
- 39. Which type of reactor is typically used for liquid-phase reactions where the reactants and products remain in the liquid phase?**
- (A) Fluidized bed reactor (B) Packed bed reactor
(C) Stirred tank reactor (D) Fixed bed reactor
- 40. Which of the following is an example of a renewable feedstock in chemical engineering?**
- (A) Crude oil (B) Natural gas (C) Corn Stover (D) Coal
- 41. Which of the following equations represents the first law of thermodynamics for a closed system undergoing a process?**
- (A) $\Delta U = Q - W$ (B) $Q = U + W$ (C) $W = Q - \Delta U$ (D) $\Delta U = Q + W$
- 42. Which of the following reactors provides the highest conversion for a first-order reaction given the same residence time?**
- (A) Batch Reactor (B) CSTR
(C) Plug Flow Reactor (D) Semi-batch Reactor
- 43. The Thiele modulus is used to characterize:**
- (A) Mass transfer in a fluidized bed reactor
(B) Heat transfer in a packed bed reactor
(C) Reaction and diffusion in porous catalysts
(D) None of the above

Electronics & Communication Engineering(Ph.D.)

1. A statement whose validity is tested on the basis of a sample is called _____.
(A) Null Hypothesis (B) Statistical Hypothesis
(C) Simple Hypothesis (D) Composite Hypothesis
2. Consider a hypothesis where H_0 where $\phi_0 = 23$ against H_1 where $\phi_1 < 23$. The test is _____.
(A) Right tailed (B) Left tailed (C) Center tailed (D) Cross tailed
3. In systematic sampling, population is 240 and selected sample size is 60 then sampling interval is _____.
(A) 240 (B) 60 (C) 4 (D) 0.25
4. If the standard deviation of a population is 50 and the sample size is 16 then the standard deviation of the sampling distribution is _____.
(A) 11.25 (B) 12.25 (C) 13.25 (D) 14.25
5. A bag contains 6 balls of different colours. A student selects 2 balls at random without replacement. Find all possible combinations of the colours of the selected balls.
(A) 13 (B) 14 (C) 15 (D) 16
6. A research problem is not feasible only when:
(A) it is researchable
(B) it is new and adds something to the knowledge
(C) it consists of independent and dependent variables
(D) it has utility and relevance
7. Rama likes to play cards. She draws 5 cards from a pack of 52 cards. What is the probability of that from the 5 cards drawn Rama draws only 2 face cards?
(A) 0.0533 (B) 0.0753 (C) 0.0633 (D) 0.6573
8. The difference between the sample value expected and the estimates value of the parameter is called as?
(A) bias (B) error (C) contradiction (D) difference
9. A statement made about a population for testing purpose is called _____.
(A) Statistic (B) Hypothesis
(C) Level of Significance (D) Test-Statistic
10. Consider a set of 18 samples from a standard normal distribution. We square each sample and sum all the squares. The number of degrees of freedom for a Chi Square distribution will be?
(A) 17 (B) 18 (C) 19 (D) 20

11. A bag contains 80 chocolates. This bag has 4 different colors of chocolates in it. If all four colors of chocolates were equally likely to be put in the bag, what would be the expected number of chocolates of each color?

- (A) 12 (B) 11 (C) 20 (D) 9

12. Which of the following distributions is used to compare two variances?

- (A) T – Distribution (B) F – Distribution
(C) Normal Distribution (D) Poisson Distribution

13. The table shows the standard Deviation and Sample Standard Deviation for both men and women. Find the f statistic considering the Men population in numerator.

Population	Population Standard Deviation	Sample Standard Deviation
Men	30	35
Women	50	45

- (A) 2.68 (B) 1.34 (C) 1.68 (D) 1.43

14. A hypothesis is a

- (A) Tentative statement whose validity is still to be tested
(B) Supposition which is based on the past experiences
(C) Statement of fact
(D) False statement

15. To test null hypothesis, a researcher uses:

- (A) t - test (B) ANOVA (C) X^2 (D) factorial analysis

16. Research problem is selected from the stand point of:

- (A) Researcher's interest (B) Financial support
(C) Social relevance (D) Availability of relevant literature

17. Which of the following is the first step in starting the research process?

- (A) Searching sources of information to locate the problem
(B) Survey of related literature
(C) Identification of the problem
(D) Searching for solutions to the problem

18. We use Factorial Analysis

- (A) To know the relationship between two variables
(B) To test the Hypothesis
(C) To know the difference between two variables
(D) To know the difference among the many variables

19. In a Binomial Distribution, if p , q and n are probability of success, failure and number of trials respectively then variance is given by _____.
- (A) np (B) npq (C) np^2q (D) npq^2
20. What are the two types of variance which can occur in your data?
- (A) Independent and cofounding (B) Between or within groups
(C) Experimenter and participant (D) Repeated and extraneous
21. Consider selecting 6 cards from a pack of cards without replacement. What is the probability that 3 of the cards will be black?
- (A) 0.3320 (B) 0.3240 (C) 0.4320 (D) 0.5430
22. Find the Variance of a Hypergeometric Distribution such that the probability that a 6-trial hypergeometric experiment results in exactly 4 successes, when the population consists of 10 items.
- (A) 14.4 (B) 144 (C) 1.44 (D) 0.144
23. Which of the following distributions is Continuous?
- (A) Binomial Distribution (B) Hyper-geometric Distribution
(C) F-Distribution (D) Poisson Distribution
24. Bernoulli trials are a part of _____ probability distribution.
- (A) Poisson (B) Binomial (C) Hyper geometric (D) Normal
25. Suppose a person has 8 red, 5 green, 12 orange, and 15 blue balls. Test the null hypothesis that the colors of the balls occur with equal frequency. What is the Chi Square value you get?
- (A) 5.6 (B) 5.68 (C) 5.86 (D) 5.8
26. The output of latches will remain in set/reset until _____
- (A) The trigger pulse is given to change the state
(B) Any pulse given to go into previous state
(C) They don't get any pulse more
(D) The pulse is edge-triggered
27. Simplify $Y = AB' + (A' + B)C$.
- (A) $AB' + C$ (B) $AB + AC$ (C) $A'B + AC'$ (D) $AB + A$
28. Knee current in the case of zener diode implies _____.
- (A) Forward bias current beyond which I-V characteristics is a straight line
(B) Reverse bias current above which I-V characteristics is a straight line
(C) Forward cut-in current beyond which current is directly proportional to voltage
(D) Maximum allowable reverse bias current through a zener diode
29. Ripple factor of center tapped full wave rectifier is _____.
- (A) 1.414 (B) 1.21 (C) 1.3 (D) 0.48

30. What is the commercial frequency deviation of frequency modulation?
 (A) 70 KHz (B) 75 KHz (C) 80 KHz (D) 85 KHz
31. The power efficiency of the M-ary PSK decreases because of the _____.
 (A) Freely packed constellation
 (B) Increment of bandwidth efficiency
 (C) Fixed null bandwidth
 (D) Densely packed constellation
32. Doppler spread refers to _____.
 (A) Signal fading due to Doppler shift in the channel
 (B) Temporary failure of message transfer
 (C) Large coherence time of the channel as compared to the delay constraints
 (D) Frequency mismatch
33. The adaptive algorithms in equalizer that do not require training sequence are called _____.
 (A) Linear adaptive algorithms (B) Blind algorithms
 (C) Non-linear adaptive algorithms (D) Spatially adaptive algorithms
34. Which of the following is not a characteristic of FIR filter?
 (A) Many zeroes (B) Poles only at $z=0$
 (C) Transfer function is a polynomial of z^{-1} (D) Many poles
35. Consider a single mode fiber having core refractive index $n_1 = 1.5$. The fiber length is 12m. Find the time taken by the axial ray to travel along the fiber.
 (A) 1.00 μ sec (B) 0.06 μ sec (C) 0.90 μ sec (D) 0.30 μ sec
36. Estimate RMS pulse broadening per km due to intermodal dispersion for multimode step index fiber where length of fiber is 4 km and pulse broadening per km is 80.6 ns.
 (A) 18.23ns/km (B) 20.15ns/km (C) 26.93ns/km (D) 10.23ns/km
37. An optical fiber has core-index of 1.480 and a cladding index of 1.478. What should be the core size for single mode operation at 1310nm?
 (A) 7.31 μ m (B) 8.71 μ m (C) 5.26 μ m (D) 6.50 μ m
38. The difference between the modes' refractive indices is called as _____.
 (A) Polarization (B) Cutoff
 (C) Fiber birefringence (D) Fiber splicing
39. What is the one sided z-transform of $x(n) = \delta(n-k)$?
 (A) z^{-k} (B) z^k (C) 0 (D) 1

40. If the ROC of the system function is the exterior of a circle of radius $r < \infty$, including the point $z = \infty$, then the system is said to be _____.
- (A) Stable (B) Causal (C) Anti-causal (D) Unstable
41. What is the period of the Fourier transform $X(\omega)$ of the signal $x(n)$?
- (A) π (B) 1 (C) Non-periodic (D) 2π
42. Which of the following condition is to be satisfied for the Fourier transform of a sequence to be equal as the Z-transform of the same sequence?
- (A) $|z|=1$ (B) $|z|<1$
(C) $|z|>1$ (D) Can never be equal
43. What is the convolution of the sequences of $x_1(n)=x_2(n)=\{1,1,1\}$?
- (A) $\{1,2,3,2,1\}$ (B) $\{1,2,3,2,1\}$ (C) $\{1,1,1,1,1\}$ (D) $\{1,1,1,1,1\}$
44. In the impedance v/s frequency graph of antenna, the antenna impedance at frequencies less than resonant frequency is _____.
- (A) inductive (B) capacitive
(C) resistive (D) both inductive and capacitive
45. A parallel resonant circuit has a resistance of 2k ohm and half power frequencies of 86 kHz and 90 kHz. What is the value of the inductor?
- (A) 4.3 mH (B) 43 mH (C) 0.16 mH (D) 1.6 mH
46. What is the total voltage gain of a high frequency response of multistage amplifier if the gain of first stage is 14dB, gain of the second stage is 12dB and gain of third stage is 24dB?
- (A) 40dB (B) 50.32dB (C) 50dB (D) 40.32dB
47. A speech signal occupying the bandwidth of 300 Hz to 3 kHz is converted into PCM format for use in digital communication. If the sampling frequency is 8kHz and each sample is quantized into 256 levels, then the output bit the rate will be
- (A) 3 kb/s (B) 8 kb/s (C) 64 kb/s (D) 256 kb/s
48. The total load capacitance is calculated as the sum of _____.
- (A) Drain capacitance in series with input capacitance
(B) Drain capacitance + interconnect capacitance + input capacitance
(C) Drain capacitance + interconnect capacitance – input capacitance
(D) Drain capacitance in parallel with input capacitance
49. For an abrupt PN junction diode, small signal capacitance is 1nF/cm^2 at zero bias condition. If the built in voltage, V_{bi} is 1V, the capacitance at reverse bias of 99V is?
- (A) 0.1nF/cm^2 (B) 1nF/cm^2 (C) 1.5nF/cm^2 (D) 2nF/cm^2
50. Which of the following is true for a pnp transistor in saturation region?
- (A) CB junction is reversed bias and the EB junction is forward bias
(B) CB junction is forward bias and the EB junction is forward bias
(C) CB junction is forward bias and the EB junction is reverse bias
(D) CB junction is reversed bias and the EB junction is reverse bias

x-x-x

Civil Engineering(Ph.D.)

1. What are the conditions in which Type-I error occurs?
(A) The null hypotheses get accepted even if it is false
(B) The null hypotheses get rejected even if it is true
(C) Both the null hypotheses as well as alternative hypotheses are rejected
(D) Both the null hypotheses as well as alternative hypotheses are accepted
2. How to judge the depth of any research?
(A) By research title
(B) By research duration
(C) By research objectives
(D) By total expenditure on research
3. In the process of conducting research, 'Formulation of Hypothesis' is followed by
(A) Statement of Objectives
(B) Analysis of Data
(C) Selection of Research Tools
(D) Collection of Data
4. The main objective of _____ study is to acquire knowledge
(A) Exploratory
(B) Descriptive
(C) Diagnostic
(D) Descriptive and Diagnostic
5. Concepts are _____ of Research
(A) Tools
(B) Guide
(C) Methods
(D) Variables
6. Why do you need to review the existing literature?
(A) To make sure you have a long list of references
(B) Because without it, you could never reach the required word-count
(C) To find out what is already known about your area of interest
(D) To help in your general studying
7. A formal document that presents the research objectives, design of achieving these objectives, and the expected outcomes/deliverables of the study is called
(A) Research design
(B) Research proposal
(C) Research hypothesis
(D) Research report
8. In a survey there is an enumerator and a _____.
(A) Guide
(B) Messenger
(C) Supervisor
(D) Respondent
9. Questions in which only two alternatives are possible are called
(A) Multiple choice questions
(B) Dichotomous questions
(C) Open ended questions
(D) Structured questions
10. Identifying causes of a problem and possible solution to a problem is
(A) Field Study
(B) Diagnostic study
(C) Action study
(D) Pilot study
11. Second step in problem formulation is
(A) Understanding the nature of the problem
(B) Statement of the problem
(C) Survey
(D) Discussions
12. What does the term 'longitudinal design' mean?
(A) A study completed far away from where the researcher lives.
(B) A study which is very long to read.
(C) A study with two contrasting cases.
(D) A study completed over a distinct period of time to map changes in social phenomena.
13. Which of the following is true regarding research objectives?
(A) Research objectives, when achieved, will provide sufficient earnings to obtain a reasonable return on investment.

- (B) Research objectives, when obtained, will ensure the viability of the marketing research department.
- (C) Research objectives, when achieved, provide the information necessary to solve the problem.
- (D) Research objectives are seldom achieved but should be stated as goals to be sought.
14. Which one is called non-probability sampling?
 (A) Quota sampling (B) Cluster sampling
 (C) Systematic sampling (D) Stratified random sampling
15. Cluster sampling, stratified sampling and systematic sampling are types of
 (A) Direct sampling (B) Indirect sampling
 (C) Random sampling (D) Non random sampling
16. The split-half method is used as a test of:
 (A) Stability (B) Internal reliability
 (C) Inter-observer consistency (D) External validity
17. A _____ is a subset of a _____.
 (A) Sample, population (B) Population, sample
 (C) Statistic, parameter (D) Parameter, statistic
18. The degree of freedom for paired t-test based on n pairs of observations is:
 (A) $2n - 1$ (B) $n - 2$ (C) $2(n - 1)$ (D) $n - 1$
19. Which test is the part of the parametric test?
 (A) Sign Test (B) Run Test for Randomness
 (C) Kruskal-Willis Test (D) z-test
20. Final stage in the Research Process is
 (A) Report Writing (B) Data collection
 (C) Data Analysis (D) Problem formulation
21. The first page of the research report is
 (A) Appendix (B) Bibliography (C) Index (D) Title Page
22. The chi-square test is:
 (A) A mean (B) A multi-question test
 (C) A statistic (D) A statistical mistake
23. ANOVA is _____
 (A) A government body which collects social statistics
 (B) The name of a statistical software package
 (C) A one-way analysis of variance
 (D) A two-way analysis of variance
24. In SPSS, what is the "Data Viewer"?
 (A) A table summarizing the frequencies of data for one variable
 (B) A spreadsheet into which data can be entered
 (C) A dialog box that allows you to choose a statistical test
 (D) A screen in which variables can be defined and labelled
25. What type of chart is useful for comparing values over categories?
 (A) Pie Chart (B) Column Chart (C) Line Chart (D) Dot Graph
26. Poisson's ratio for concrete
 (A) Remains constant (B) Increases with richer mixes

- (C) Decreases with richer mixes (D) Does not depend on mix proportion
27. The main reasons for providing number of reinforcement bars at a support in a simply supported beam is to resist in that zone
 (A) Compressive stress (B) Shear stress
 (C) Bond stress (D) Tensile stress
28. Wetted perimeter of a regime channel for a discharge of 64 cumecs as per Lacey's theory will be
 (A) 19m (B) 38m (C) 57m (D) 76m
29. Uniformity coefficient of a soil is
 (A) Always less than 1 (B) Always equal to 1
 (C) Equal to or less than 1 (D) Equal to or greater than 1
30. Two pipes of same length and diameter d and $2d$ respectively are connected in series. The diameter of an equivalent pipe of same length is
 (A) Less than d (B) Between d and $1.5 d$
 (C) Between $1.5 d$ and $2d$ (D) Greater than $2d$
31. The state of wood which has no capillary water but contains hygroscopic water only, is known as
 (A) Drying point (B) Dead wood point
 (C) Fibre saturation point (D) Capillary seizure point
32. The minimum particle size of fine aggregate is
 (A) 0.0075 mm (B) 0.075 mm (C) 0.75 mm (D) 0.95 mm
33. According to IS: 456, a column or a strut is a member whose effective length is greater than
 (A) the least lateral dimension (B) 2 times the least lateral dimension
 (C) 3 times the least lateral dimension (D) 4 times the least lateral dimension
34. A beam of rectangular cross-section is 100mm wide and 200mm deep. If the section is subjected to a shear force of 20 kN, then the maximum shear stress in the section is
 (A) 1 N/mm² (B) 1.125 N/mm² (C) 1.33 N/mm² (D) 1.5 N/mm²
35. A vertical triangular area with vertex downward and altitude 'h' has its base lying on the free surface of a liquid. The centre of pressure below the free surface is at a distance
 (A) $h/4$ (B) $h/3$ (C) $h/2$ (D) $2h/3$
36. Whenever an activity has zero total float, then
 (A) Free float of the activity must be zero but independent float need not be zero
 (B) Independent float must be zero but free float need not be zero
 (C) Free float and independent float both must be zero
 (D) Free float and independent float both need not be zero
37. The shear stress at the neutral axis in a beam of triangular section with a base of 40 mm and height 20 mm, subjected to a shear force of 3 KN is
 (A) 3 MPa (B) 6 MPa (C) 10 MPa (D) 20 MPa
38. The soundness of cement is tested by
 (A) Le-chatelier apparatus (B) Compression test
 (C) Vicats apparatus (D) Shores tester
39. Biochemical Oxygen Demand (B.O.D.) of safe drinking water must be
 (A) 4 mg/l (B) 10 mg/l (C) 20 mg/l (D) Nil
40. What is the capillary rise in soil with a void ratio of 0.5 and effective size of 0.01 mm with a constant $C = 20 \text{ mm}^2$ which depends on grain and impurities of the material?

- (A) 3.5 m (B) 4.5 m (C) 2.6 m (D) 4.0 m
41. A soil sample has a porosity of 30 percent. The specific gravity of soil is 2.65. Calculate the dry density of soil.
 (A) 26.5 kN/m³ (B) 21.3 kN/m³ (C) 18.2 kN/m³ (D) 14.5 kN/m³
42. The PCU recommended by the IRC for Agricultural tractor on rural roads is
 (A) 3 (B) 1.5 (C) 1 (D) 0.5
43. Time taken by the driver for final action such as brake application is known as
 (A) Volition time (B) Intellection time
 (C) Perception time (D) Emotion time
44. The following compound is responsible for the later stage strength of cement
 (A) Gypsum (B) Tricalcium aluminate
 (C) Tricalcium silicate (D) Dicalcium silicate
45. The minimum quantity of cement content needed in 1m³ of a reinforced concrete which is exposed to weather is (in kg)
 (A) 200 (B) 250 (C) 300 (D) 350
46. If 2% solution of a sewage sample is incubated for 5 days at 20°C and depletion of oxygen was found to be 5 ppm, B.O.D. of the sewage is
 (A) 200 ppm (B) 225 ppm (C) 250 ppm (D) 300 ppm
47. Sodium absorption ratio of high sodium water lies between
 (A) 18 and 26 (B) 26 and 35 (C) 10 and 15 (D) 36 and 40
48. If the water content of a soil sample is 25.5 percent, the specific gravity is 2.70, and dry density is 1500kg/m³, then the degree of saturation is equal to
 (A) 86.06 percent (B) 82.51 percent (C) 89.56 percent (D) 80.56 percent
49. The measured length of a village road with a 20 m chain was found to be 250 m. What is the true length of the road if the chain length was 20 cm too long?
 (A) 255.5 m (B) 245.5 m (C) 249.8 m (D) 252.5 m
50. The conversion of a whole circle bearing 170°30' into quadrantal bearing is
 (A) S 11°30' E (B) S 12°30' E (C) S 9°30' E (D) S 10°30' E

x-x-x

(ROUGH WORK)

Information Technology Engineering(Ph.D.)

1. The first step of research is:
(A) Selecting a problem (B) Searching a problem
(C) Finding a problem (D) Identifying a problem
2. Which of the following features are considered as critical in qualitative research?
(A) Collecting data with the help of standardized research tools.
(B) Design sampling with probability sample techniques.
(C) Collecting data with bottom-up empirical evidence.
(D) Gathering data with top-down schematic evidence.
3. To test null hypothesis, a researcher uses:
(A) t test (B) ANOVA (C) X^2 (D) factorial analysis
4. Research is
(A) Searching again and again
(B) Finding a solution to any problem
(C) Working in a scientific way to search for the truth of any problem
(D) Research is a casual and haphazard exploration without a systematic approach or methodological rigor
5. A null hypothesis is
(A) when there is no difference between the variables
(B) the same as research hypothesis
(C) subjective in nature
(D) when there is difference between the variables
6. When a research problem is related to heterogeneous population, the most suitable sampling method is:
(A) Cluster Sampling (B) Stratified Sampling
(C) Convenient Sampling (D) Lottery Method
7. Increasing the sample size has the following effect upon the sampling error?
(A) It increases the sampling error
(B) It reduces the sampling error
(C) It has no effect on the sampling error
(D) Increasing the sample size always eliminates sampling error completely
8. Sample is regarded as a subset of?
(A) Data (B) Set (C) Distribution (D) Population
9. The difference between the expected value of a statistic and the value of the parameter being estimated is called a:
(A) Standard error (B) Bias (C) Sampling error (D) Non-sampling error

10. What is the purpose of a literature review in a research paper?
 - (A) To outline the methods used in the research
 - (B) To provide a summary of existing research on the topic
 - (C) To present the results and findings of the study
 - (D) To discuss the implications of the research
11. Which section of a research paper typically includes hypotheses or research questions?
 - (A) Abstract
 - (B) Introduction
 - (C) Methodology
 - (D) Discussion
12. What is the main purpose of the methodology section in a research paper?
 - (A) To summarize the findings of the study
 - (B) To discuss the implications of the research
 - (C) To describe the procedures used in the study
 - (D) To compare the study with previous research
13. What is the role of the conclusion section in a research paper?
 - (A) To introduce the topic and provide background information
 - (B) To describe the procedures and methods used in the study
 - (C) To summarize the key findings and discuss their implications
 - (D) To list all the references cited in the paper
14. If a medical test incorrectly indicates a healthy person as sick, this is an example of:
 - (A) Type I error
 - (B) Type II error
 - (C) Both Type I and Type II errors
 - (D) Neither Type I nor Type II error
15. What is the purpose of a pilot study?
 - (A) To test the feasibility of the research design
 - (B) To test the reliability and validity of the measures
 - (C) To determine the appropriate sample size
 - (D) To collect preliminary data
16. What is the difference between an independent and dependent variable?
 - (A) The independent variable is manipulated by the researcher, while the dependent variable is measured
 - (B) The dependent variable is manipulated by the researcher, while the independent variable is measured
 - (C) Both the independent and dependent variables are manipulated by the researcher
 - (D) Both the independent and dependent variables are measured
17. What is the purpose of research design?
 - (A) To develop a hypothesis
 - (B) To select a sample
 - (C) To determine the methods for data collection and analysis
 - (D) To ensure complete and flawless execution of the research plan without any room for error
18. Literature collected for review includes
 - (A) Primary and Secondary Sources
 - (B) Secondary and Tertiary Sources
 - (C) Primary and Tertiary Sources
 - (D) Literature collected for review includes only personal opinions and anecdotes
19. Literature review is basically to bridge the gap between
 - (A) Newly established facts
 - (B) Previously established facts
 - (C) Facts established time to time
 - (D) Previous to current established facts
20. Literature collected is reviewed and preferably arranged
 - (A) Alphabetically
 - (B) Chronologically
 - (C) Randomly
 - (D) Based on the length of the articles

21. If any regression coefficient's value is zero, the two variables are:
 (A) Independent (B) Qualitative (C) Dependent (D) Perfectly correlated
22. How does Mendeley help organize research papers?
 (A) By automatically categorizing them into folders based on the title
 (B) By allowing users to manually sort papers into folders and tag them with keywords
 (C) By converting papers into audio files for easy listening
 (D) By summarizing papers into bullet points
23. Which of the following is an advantage of using LaTeX for academic writing?
 (A) It requires a constant internet connection to work
 (B) It is difficult to learn and use compared to word processors
 (C) It provides precise control over formatting and layout
 (D) It does not support collaborative editing
24. An interview method where the interviewer has a set of predetermined questions but can also ask follow-up questions and explore new topics is known as:
 (A) Semi-structured interview (B) Structured interview
 (C) Unstructured interview (D) Group interview
25. What type of data is XML considered to be?
 (A) Structured (B) Unstructured (C) Semi-structured (D) Non-relational
26. What is Hadoop primarily used for?
 (A) Managing structured data in relational databases
 (B) Storing and processing big data in a distributed computing environment
 (C) Running real-time analytics on small datasets
 (D) Creating graphical visualizations of data
27. Two types of research data include-
 (A) Recognised and unrecognised data (B) Structured and unstructured data
 (C) Qualitative and quantitative data (D) Organized and processed data
28. Data that are collected or sourced from the internet is called _____.
 (A) Documentary sources of data (B) Internal secondary sources of data
 (C) External secondary sources of data (D) Experiential sources of data
29. A relation is in ___ if it is in Boyce Codd normal form and does not have any multivalued dependencies.
 (A) 1NF (B) 2NF (C) 3NF (D) 4NF
30. A common approach to normalization is to ___ the larger table into smaller tables and link them together by using relationships.
 (A) Add (B) Subtract (C) Multiply (D) Divide
31. The length of an IPv6 address is?
 (A) 32 bits (B) 64 bits (C) 128 bits (D) 256 bits
32. Which layer of the TCP / IP stack corresponds to the OSI model transport layer?
 (A) Host to host (B) Application (C) Internet (D) Network Access

33. Which one of the following is not considered as a real-time operating system?
 (A) PSOS (B) linuxRT (C) VRTX (D) Windows
34. If a page number is not found in the translation lookaside buffer, then it is known as a?
 (A) Translation Lookaside Buffer miss (B) Buffer miss
 (C) Translation Lookaside Buffer hit (D) Buffer Hit
35. A deadlock avoidance algorithm dynamically examines the _____ to ensure that a circular wait condition can never exist.
 (A) operating system (B) resources
 (C) system storage state (D) resource allocation state
36. What is the value of the postfix expression 6 3 2 4 + - *?
 (A) 74 (B) -18 (C) 22 (D) 40
37. Which of the following tree data structures is not a balanced binary tree?
 (A) Splay tree (B) B-tree (C) AVL tree (D) Red-black tree
38. What is the advantage of a hash table as a data structure?
 (A) easy to implement (B) faster access of data
 (C) exhibit good locality of reference (D) very efficient for less number of entries
39. What is the time complexity of the best-known comparison-based sorting algorithms, such as Quicksort and Mergesort, in the average case?
 (A) $O(n)$ (B) $O(n \log n)$ (C) $O(\log n)$ (D) $O(n^2)$
40. Which algorithm design technique is suitable for solving problems where the solution space is too large to be explored exhaustively?
 (A) Brute Force (B) Greedy algorithms
 (C) Backtracking (D) Divide and Conquer
41. Which of the following is true about Arduino IoT devices?
 (A) They are open-source software (B) They can only read analog inputs
 (C) They have their own operating systems (D) They don't have pre-programmed firmware
42. Which of the following is not an IoT platform?
 (A) Amazon Web Services (B) Microsoft Azure
 (C) Sales force (D) Flipkart
43. _____ are the compositions for Artificial Intelligence Agents.
 (A) Only Program (B) Only Architecture
 (C) Both Program and Architecture (D) None of these
44. Which of the following is the first and foremost step in Image Processing?
 (A) Image acquisition (B) Segmentation
 (C) Image enhancement (D) Image restoration
45. Which of the following tools is used in tasks such as zooming, shrinking, rotating, etc.?
 (A) Filters (B) Sampling (C) Interpolation (D) File Compression

46. Choose the most appropriate word from the options given below to complete the following sentence.
 “If you are trying to make a strong impression on your audience, you cannot do so by being understated, tentative or _____”
 (A) Hyperbolic (B) Restrained (C) Argumentative (D) Indifferent
47. If the Median of the data 30, 8, 7, 3, 17, 15, 21, 24, 29, 23 is x and the median of the data obtained by replacing 3 by 33 and 8 by 18 in the above data is y, then what is the difference between y and x?
 (A) 4 (B) 1 (C) 2 (D) 3
48. What is an assumption when a data set is normally distributed?
 (A) The central tendency of populations is always equal to or greater than some constant.
 (B) Data points in a data set are, on average, equally spaced.
 (C) It has a standard deviation equal to 1.
 (D) Outliers are absent in the dataset.
49. The decision rule in a chi-square goodness of fit test is to reject the null hypothesis if _____
 (A) The computed chi-square is less than the table chi-square
 (B) The computed chi-square is greater than the table chi-square
 (C) The computed chi-square is greater than zero
 (D) The computed chi-square is greater than the number of categories
50. Which of the following is an essential concept related to Cloud?
 (A) Reliability (B) Abstraction (C) Productivity (D) Low latency

x-x-x

(ROUGH WORK)

Law (Ph.D.)

1. Which of the following is not a primary source of law?
(A) Ordinance (B) Constitutional Assembly Debates
(C) Customs (D) Delegated Legislation
2. Which of the following is not a characteristic of longitudinal survey?
(A) Collecting data from same subjects over a period of time
(B) Observe variables repeatedly
(C) Analysing changes at both individual and group level
(D) Get a “snapshot” or picture of a group
3. Which of the following is a characteristic of qualitative research?
(A) Objective (B) Quantifiable data
(C) Subjective interpretation (D) Statistical analysis
4. Which of the following involves a set of predetermined questions and highly standardized techniques of recording?
(A) Structured interview (B) Unstructured interview
(C) Interview guide (D) All of these
5. Which of the following is a primary step in social science research?
(A) Preparing the Research Design (B) Developing the Research Hypothesis
(C) Formulation of research problem (D) Execution of the Project
6. What are the main purposes of data analysis?
I. Description
II. Construction of Measurement Scale
III. Generating empirical relationships
IV. Explanation
(A) I, II and III (B) II, III and IV (C) I, III and IV (D) All of these
7. Which of the following is not a type of research design?
(A) Descriptive (B) Experimental (C) Longitudinal (D) Theoretical
8. What is the term used to describe the extent to which a study measures what it claims to measure?
(A) Reliability (B) Validity (C) Accuracy (D) Precision
9. Read the following statements.
I. This type of research is done out of intellectual interest or inquisitiveness. So it is not all about resolving issues.
II. Its goal is to raise public awareness.
III. It could lead to the development of a new theory or the refinement of an existing one.

What kind of research do these statements mainly focus on?

- (A) Applied research (B) Action research (C) Pure research (D) Exploratory research
10. It is type of survey method used to collect data to make inferences about a population of interest (universe) at one point in time, it is known as:
 (A) Longitudinal survey (B) Correlational survey
 (C) Pooled surveys (D) Cross-sectional survey
11. What does the term "reliability" refer to in research?
 (A) Consistency of measurement (B) Accuracy of measurement
 (C) Validity of measurement (D) Generalizability of findings
12. What is the purpose of a control group in an experiment?
 (A) To provide a standard of comparison (B) To manipulate variables
 (C) To eliminate bias (D) To enhance generalizability
13. What is a population in research?
 (A) The entire group of interest
 (B) A small subset of the sample
 (C) The complete list from which samples are to be drawn
 (D) The dependent variable
14. Which of the following methods is the study of a group of people and their culture, its strength is description. It also provides the reader with a detailed picture of what is going on, from the perspective of natives of the given culture?
 (A) Life history (B) Ethnography (C) Case study (D) Content analysis
15. What is a dependent variable in an experiment?
 (A) The variable that is manipulated (B) The variable that is measured
 (C) The control variable (D) The independent variable
16. A 'Theory' may be defined as:
 (A) A general notion or idea of something formed by mentally combining all its characteristics or particulars.
 (B) A coherent group of general propositions used as principles of explanation for a class of phenomena.
 (C) Systematic inquiry into a subject in order to discover or revise facts etc.
 (D) A systematized effort to gain new knowledge.
17. What is sampling bias?
 (A) A systematic error in the sampling process
 (B) A random error in the sampling process
 (C) A bias introduced by the researcher
 (D) A bias introduced by the participants
18. 'SPSS' stands for:
 (A) Statistical Package for Social Sciences.
 (B) Social Procedures for Statistical Science.
 (C) Standard Procedures for Social Standards.
 (D) Statistical Procedures for Secondary Solutions.
19. "Survey Methods" of data collection do not include:

- (A) Case-Studies (B) Questionnaires (C) Schedules (D) Interview Guides
20. Results of which methods cannot be generalised to the population at large?
 (A) Survey (B) Experiment (C) Case study (D) Field study
21. An approach used to quantify qualitative information by sorting data and comparing different pieces of information to summarise into useful information is known as:
 (A) Content Analysis (B) Evaluative Coding
 (C) Participant Observations (D) Rapport Establishment
22. What is a confounding variable in an experiment?
 (A) A variable that is intentionally manipulated
 (B) A variable that is measured
 (C) A variable that is held constant
 (D) A variable that interferes with the relationship between the independent and dependent variables
23. What is an operational definition?
 (A) A definition that specifies how a variable will be measured or manipulated in a study
 (B) A definition based on theory
 (C) A definition that is subject to interpretation
 (D) A definition that is based on personal opinion
24. What is sampling error?
 (A) A systematic error in the sampling process
 (B) A random error in the sampling process
 (C) A bias introduced by the researcher
 (D) A bias introduced by the participants
25. What is a cohort study?
 (A) A study that follows a group of individuals over time
 (B) A study that compares two groups of individuals
 (C) A study that measures variables at one point in time
 (D) A study that manipulates variables
26. Theory of 'Utilitarian Individualism' was propounded by-
 (A) Savigny (B) Maine (C) Puchta (D) Bentham
27. "Law is a product of social life and is not created by arbitrary will of individual but by slow unavoidable advancement of human development". This statement belongs to-
 (A) Analytical school (B) Historical school
 (C) Sociological school (D) Philosophical school
28. Sociological jurisprudence arose as a reaction to:
 (A) Positivism (B) Naturalism (C) Historical analysis (D) Ethical analysis
29. All cases of *damnum sine injuria* are cases of :
 (A) Disability (B) Liability for causing injury
 (C) Liberty (D) No-right

30. Which Article of the Constitution of India reflects the Volkgeist theory of Savigny?
 (A) Article 13 (B) Article 34 (C) Article 35 (D) Article 12
31. The Constitution of India provides special provisions for which of the following States?
 (A) Maharashtra, Gujarat and Karnataka
 (B) Delhi, Kerala and Punjab
 (C) Madhya Pradesh, Nagaland and Sikkim
 (D) Madhya Pradesh, Punjab and Assam
32. Which schedule of the Constitution of India contains special administration and control provisions for Scheduled Areas and Scheduled Tribes?
 (A) Third Schedule (B) Eighth Schedule (C) Fifth Schedule (D) Seventh Schedule
33. The writ of Mandamus can be issued against which of the following?
 (A) Public corporation (B) The President of India
 (C) Legislature to enact a particular law (D) Any private individual
34. The concept of parliamentary form of Government in the Constitution of India is derived from the Constitution of which country?
 (A) United Kingdom (B) Japan (C) Canada (D) Germany
35. Fundamental Duties have been added in the Constitution by 42nd Amendment Act, 1976 in accordance with the recommendations of-
 (A) Santhanam Committee (B) Sarkaria Committee
 (C) Swaran Singh Committee (D) Indira Gandhi-Nehru Committee
36. Under the provision of Hindu Succession Act, 1956, any property inherited by a female Hindu from her father or mother shall devolve, in absence of any son or daughter of the deceased (including the children of any pre-deceased son or daughter):
 (A) Upon the heirs referred to in Section 15(1) of the Act
 (B) Upon the heirs of deceased female's father
 (C) Upon the heirs of deceased female's husband
 (D) None of the above
37. The Hindu Marriage Act, 1955 does not apply to –
 (A) A member of schedule tribe
 (B) A non-Hindu (not being a Muslim, Christian, Parsi or Jew) who would have been governed by the Hindu law or by any custom or usage as part of that law in respect of the matters dealt with in this Act before this Act was passed
 (C) To any person who is a reconvert to the Hindu, Buddhist, Jaina or Sikh religion
 (D) An illegitimate child one of whose parents is a Hindu, Buddhist, Jaina or Sikh by religion and who is brought up as a member of the tribe, community, group or family to which such parent belongs or belonged
38. Rule of 'fair trial to marriage' as specified by the Supreme Court is mentioned under:
 (A) Section 13(B) of Hindu Marriage Act, 1955
 (B) Section 13(1A) of Hindu Marriage Act, 1955
 (C) Section 14 of Hindu Marriage Act, 1955
 (D) Section 15 of Hindu Marriage Act, 1955

39. Power to give a divorce can be delegated by a Muslim husband to:
 (A) Wife (B) A third person
 (C) Either the wife or a third person (D) Power to divorce cannot be delegated
40. Under Section 2(vii) of the Dissolution of Muslim Marriage Act 1939, a Muslim wife shall be entitled to obtain a decree for dissolution of her marriage :
 (A) When she has been given in marriage by her father or other guardian before she attained the age of 15 years and repudiated the marriage before attaining the age of 18 years, provided that the marriage has not been consummated
 (B) When she has been given in marriage by her father or other guardian after she attained the age of 15 years and repudiated the marriage before attaining the age of 18 years, where the marriage has been consummated
 (C) When she has been given in marriage by her father or other guardian before she attained the age of 18 years and repudiated the marriage immediately after attaining the age of 18 years, where the marriage has not been consummated
 (D) None of the above
41. An accomplice under Section 306 of the Code of Criminal Procedure 1973 may be tendered pardon when:
 (A) He is not in a position to stand trial due to infirm health
 (B) When he is declared insolvent
 (C) When he undertakes to make full and true disclosure of the facts relating to the offence
 (D) When he is a terminally ill person
42. A prostitute, suffering from communicable disease, has sexual intercourse with a man representing that she was free from any disease commits:
 (A) Unnatural offence (B) Hurt (C) Cheating (D) Mischief
43. There is no jurisdiction to grant bail under Section 438 of Code of Criminal Procedure, 1973 in:
 (A) The Court of Magistrate (B) The Court of Session
 (C) The High Court (D) Both (B) and (C)
44. If a witness who is unable to speak, gives his evidence in writing in the open court, evidence so given shall be deemed to be:
 (A) Documentary evidence (B) Primary evidence
 (C) Oral evidence (D) Secondary evidence
45. A person is believed to have acted in 'good faith' when it is proven that the accused-
 (A) Acted with due care and caution
 (B) Acted honestly
 (C) Was a God fearing and religious person
 (D) Lacked *mens rea*
46. Following applies to voidable contracts:
 (A) Consensus and evidence of intention to contract are present and the consent obtained is a real or genuine consent

- (B) Consensus and evidence of intention to contract are present but the consent obtained is not a real or genuine consent
- (C) None of the parties to the contract can exercise his option to elect to be bound by the contract or to disown or repudiate it
- (D) None of the above
47. For a contingent contract it is important that the contingent event on which the performance is dependent is-
- (A) Certain (B) Uncertain (C) Part of the transaction (D) Impossible
48. Liability of surety is:
- (A) Conditional on default (B) Primary
- (C) Always absolute (D) Independent of default
49. The pawnee has:
- (A) Only right to sell (B) Only right to sue
- (C) Either right to sell or right to sue (D) Both right to sell and right to sue
50. A contract is not voidable because it was caused by a mistake as to any law in force in India, but mistake as to law not in force in India has the same effect as:
- (A) A mistake of understanding (B) A mistake of fact
- (C) A mistake of law (D) A mistake of opinion

x-x-x

Faculty of Pharmaceutical Sciences

1. According to BIS, heavy metals (arsenic, cadmium, mercury) shall be determined using
(A) HPTLC (B) Atomic Absorption spectroscopy
(C) HPLC (D) GC
2. R_f value is defined as:
(A) Ratio of the distance travelled by the solute to solvent
(B) Ratio of the distance travelled by the desired compound to the compound immediately below it
(C) Ratio of the distance travelled by the desired compound and its reference
(D) Ratio of the distance travelled by the desired compound to the compound immediately above it
3. Which of the following is used as a standard bitter substance to determine the bitterness value of crude drugs?
(A) Amarogentin (B) Quinine (C) Chirantin (D) None of these
4. Which of the following technique is of choice for determination of organochlorides and pyrethroids insecticidal content in crude drugs.
(A) HPLC (B) GC (C) UPLC (D) HPTLC
5. Acid insoluble ash is mainly used to measure the amount of _____ present in the sample of crude drug.
(A) Carbonates (B) Oxides
(C) Sand and siliceous matter (D) Chlorides
6. To determine stomatal index, average of NLT _____ 1 mm^2 readings are taken according to the WHO document.
(A) 4 (B) 10 (C) 5 (D) 15
7. Polymerase chain reaction is a method of
(A) Gene amplification (B) Gene cloning
(C) Gene expression (D) Both B & C
8. "Mottling" in tablets occurs due to
(A) Hardness (B) Friability (C) Entrapped air (D) Degradation
9. What size of DNA insert can be cloned using yeast artificial chromosome?
(A) 6-12 kb (B) 100-300 kb (C) 25-40 kb (D) 200-2000 kb
10. Cosmid is the hybrid of
(A) Two bacteriophage
(B) Plasmid and bacterial artificial chromosome
(C) Plasmid and bacteriophage
(D) Plasmid and artificial chromosome
11. Which of the following is critical component used to develop immunosensors?
(A) Enzyme (B) Nucleic acid (C) Antibodies (D) Microbes

12. Which are two key hormones involved in regulation of blood glucose?
 (A) Insulin and thyroid (B) Thyroid and glucagon
 (C) Amylin and thyroid (D) Insulin and glucagon
13. Which of the following statements about agarose gel electrophoresis is false?
 (A) It is common method to separate DNA
 (B) Positively charged DNA moves towards negatively charged electrode
 (C) Ethidium bromide is used to detect DNA
 (D) None
14. In SDS –PAGE separation of protein is affected by
 (A) Size of protein (B) Charge of protein
 (C) Conformation of protein (D) None
15. Which antibodies are used in ELISA technique?
 (A) Primary antibodies (B) Secondary antibodies
 (C) Primary as well as secondary antibodies (D) Primary, secondary and tertiary antibodies
16. Ame's test is used for testing
 (A) Potential of test compounds to cause mutagenesis
 (B) Potential of test compounds to cause infection
 (C) Potential of test compounds to detect antigen
 (D) Potential of test compounds to induce gene regulations
17. Ethanol can be used as a solvent in UV spectrophotometric analysis because
 (A) It is polar (B) Absorbs weakly in the range of 200-400 nm
 (C) It is volatile (D) It is miscible with water
18. A monochromator is not used in
 (A) UV Spectrometer (B) FT-IR Spectrometer
 (C) Spectrofluorimeter (D) Dispersive IR Spectrometer
19. The most intense peak in mass spectrum is called as
 (A) Base peak (B) Metastable ion peak
 (C) Molecular ion peak (D) Rearrangement ion peak
20. Which of the following is not a classical bioisostere of -CH₂-
 (A) -NH- (B) -S- (C) -O- (D) -OH
21. The following functional group is present in the structure of paracetamol
 (A) -NHCOCH₃ (B) -COOH (C) -NH₂ (D) -COOCH₃
22. Which of the following statement about TMS is wrong?
 (A) TMS is used as an internal standard for NMR
 (B) It can be used as a solvent in NMR
 (C) It is chemically inert

- (D) It has 12 equivalent protons
23. Which of the following antiviral drug is a prodrug?
 (A) Acyclovir (B) Ganciclovir (C) Valganciclovir (D) Idoxuridine
24. What are the factor/s affecting chemical shift in NMR?
 (A) Electronegativity and Inductive effect
 (B) Anisotropic effect and Hydrogen Bonding
 (C) Deshielding and Shielding effects
 (D) All of these
25. Which of the following statement is false about sustained release dosage form?
 (A) Longer time to attain therapeutic blood concentrations
 (B) Reduced rate of metabolism
 (C) Increased safety margin of high potency drugs
 (D) None of the above
26. Which of the following match is wrong about polymer and its application?
 (A) Carboxy methyl cellulose - Swelling agent
 (B) Polyvinyl alcohol - Tablet binding and coating
 (C) Ethyl cellulose - Sustained release system
 (D) HPMC - Coating and binder
27. Which are the 3D printing technologies used in pharmaceuticals drug delivery?
 a) Inkjet printing b) Zip dose c) Thermal inkjet printing d) Fused deposition modelling
 (A) a and b (B) c and d (C) b, c and d (D) a, b, c and d
28. Which of the following statement/s is false about Gastro-Retentive Drug Delivery Systems?
 (A) Reduced bioavailability
 (B) Reduced rate of biotransformation
 (C) Reduce fluctuations of drug concentration
 (D) Unsuitable for drugs with limited acid solubility
29. Best flavor for a sour tasting drug is
 (A) Sweet (B) Citrus (C) Chocolate (D) Salty
30. The Quartz UV region extends from
 (A) 200-400 nm (B) 10-400 nm (C) 200-800 nm (D) 10-200 nm
31. Which of the following material is used for microencapsulation?
 (A) Shellac (B) Fibrin (C) Gelatin (D) All of these
32. Which chemical structural features are essentially required for DNA intercalation?
 (A) Macro structures (B) Planar Aromatic system
 (C) Sugar moieties (D) All of these
33. Which of the following is an H₂ receptor blocker?
 (A) Cetirizine (B) Fexofenadine (C) Loratadine (D) None of these

34. Which of the following anticancer agents acts by inhibiting the hormonal enzyme?
 (A) Exemestane (B) Estramustine (C) Methotrexate (D) Etoposide
35. Trifluridine is composed of which heterocyclic ring system?
 (A) Pyridazine (B) Piperidine (C) Pyrimidine (D) Pyridine
36. The functional group which contributes to the instability of aspirin is
 (A) Carboxyl (B) Amide (C) Ester (D) Ether
37. The cyclic ester is also known as-
 (A) Lactam (B) Indole (C) Lactone (D) Pyran
38. Identify the ailment for which drug Mementine is used
 (A) Alzheimer's disease
 (B) Antidote for anticholinesterase poisoning
 (C) As an insecticide
 (D) Glaucoma
39. The order of acidity for NH_3 , H_2O , HF and CH_4 is-
 (A) $\text{H}_2\text{O} > \text{CH}_4 > \text{HF} > \text{NH}_3$ (B) $\text{HF} > \text{H}_2\text{O} > \text{NH}_3 > \text{CH}_4$
 (C) $\text{CH}_4 > \text{H}_2\text{O} > \text{HF} > \text{NH}_3$ (D) $\text{NH}_3 > \text{HF} > \text{H}_2\text{O} > \text{CH}_4$
40. The activated proton pump inhibitors bind to which amino acid in the proton pump?
 (A) Serine (B) Cysteine (C) Lysine (D) Histidine
41. Which microorganism is associated with the appearance of ulcers?
 (A) Escherichia coli (B) Staphylococcus aureus
 (C) Enterococcus faecalis (D) Helicobacter pylori
42. Which of the following is true with respect to the crystal used in ATR FTIR?
 (A) Should have high refractive index (B) Should have low refractive index
 (C) No relevance of refractive index (D) Should absorb IR radiations
43. Identify the antibiotic with antifungal properties from the following options
 (A) Nystatin (B) Amphotericin B (C) Griseofulvin (D) All of these
44. Which one of the following fragmentation pathways involves double bond and a γ -hydrogen in mass spectrometry?
 (A) Tropylium formation (B) Mc-lafferty rearrangement
 (C) Retro-Diel's Alder rearrangement (D) None of these
45. In IR spectrum, the fingerprint region ranges from
 (A) 4000 cm^{-1} to 900 cm^{-1} (B) 4000 cm^{-1} to 1400 cm^{-1}
 (C) 1400 cm^{-1} to 900 cm^{-1} (D) 4000 cm^{-1} to 666 cm^{-1}
46. Crude fibre value of a drug is a measure of
 (A) Soft tissue matter (B) Woody matter (C) Mineral matter (D) Organic matter

47. *Rauwolfia serpentina* differs from *R. tetraphylla* on the basis of
- (A) Absence of sclerieds (B) Presence of sclerieds
(C) Absence of cork cells (D) All of these
48. Accelerated stability testing of emulsions is done by
- (A) Centrifugation (B) Phase separation (C) Cracking (D) Phase inversion
49. In a research report, the use of bibliography is:
- (A) to talk about objectives of a research problem
(B) to help those interested in further research
(C) to help in identifying a research problem
(D) all the above
50. One of the following is the most important factor to be considered while selecting a research problem
- (A) Researcher's interest (B) Financial support
(C) Social relevance (D) Availability of relevant literature

x-x-x

(ROUGH WORK)