Government of Karnataka

Department of School Education

(Pre-University)

STATISTICS REVISED QUESTION BANK

2024 - 25

For **First Year P U C**

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UNIT – I

INTRODUCTION – MEANING AND SCOPE

Choose the most appropriate answer from the choices given.

1. Who is the father of statistics?
   a) R. A. Fisher b) A. L. Bowley c) Horace Secrist d) Boddington.

2. The Latin word from which the term 'STATISTICS' has been derived is:
   a) Status b) Statista c) Statistik d) Statistique

3. The Italian word from which the term 'STATISTICS' has been derived is:
   a) Status b) Statista c) Statistik d) Statistique

4. The German word from which the term 'STATISTICS' has been derived is:
   a) Status b) Statista c) Statistik d) Statistique

5. The French word from which the term 'STATISTICS' has been derived is:
   a) Status b) Statista c) Statistik d) Statistique

6. Who defined STATISTICS as "the science of counting"?
   a) R. A. Fisher b) A. L. Bowley c) Horace Secrist d) Boddington.

7. The totality of units under consideration is called:
   a) Population b) Sample c) Avariable d) Anattribute

8. The representative units of a population is called -
   a) Sample b) A variable c) An attribute d) Nominal scale

9. A quantitative characteristic which varies from unit to unit is:
   a) Population b) Sample c) A variable d) An attribute

10. A qualitative characteristic which varies from unit to unit is:
    a) Population b) Sample c) A variable d) An attribute

11. A number assigned for every unit for identification of different categories is called-
    a) Anominal scale b) An ordinal scale c) A variable d) An attribute

12. Numbers assigned to observations that can be arranged in ascending or descending order is called-
    a) Anominal scale b) An ordinal scale c) A variable d) An attribute

13. The statistical study of human population is called –
    a) Biometry b) Demography c) Econometrics d) Stylometry

Fill in the blanks by choosing the appropriate word from those given in the brackets.

(Demography, Variable, Population, Attribute, Statista, Ordinal, Statistique, Sample, Nominal, Quantitative, Qualitative, Status, Aggregate, Statistik, Numerically, Discrete)

1. The Latin word from which the term 'STATISTICS' has been derived is _____.
2. The Italian word from which the term 'STATISTICS' has been derived is _____.
3. The German word from which the term 'STATISTICS' has been derived is _____.
4. The French word from which the term 'STATISTICS' has been derived is _____.
5. The totality of units under consideration is called _____.
6. The representative units of a population is called _____.
7. Numerically measurable characteristics are called _____ characteristics.
8. The characteristics which are not numerically measurable are _____ characteristics.
9. A quantitative characteristic which varies from unit to unit is _____.
10. A qualitative characteristic which varies from unit to unit is _____.
11. The statistical study of human population is called _____.
12. Statistics are _____ of facts.
13. Statistics are _____ expressed.
14. A number assigned for every unit for identification of different categories is called a _____ scale.
15. Numbers assigned to observations that can be arranged in ascending or descending order is called an _____ scale.

Match the following. (Direct answers are given)

	Status		Latin word
	Statista		Italian word
	Statistik		German word
	Statistique		French word
	Sir Ronald A. Fisher		Father of statistics
	P. C. Mahalanobis		Father of Indian statistics
	Demography		Statistical study of human population
	Actuarial science		Statistics in the field of insurance
	Quantitative data		Numerically expressed
	Height		Variable
	Skin colour		Attribute

One mark questions

1. Who is the father of Indian Statistics?
2. Name the Latin word from which the term "STATISTICS" has been derived.
3. Who defined STATISTICS as "the science of counting"?
4. Define Bowley's definition of Statistics.
5. Give Boddington's definition of Statistics.
6. State Croxton and Cowden definition of Statistics.
7. Does Statistics deal with individual data?
8. Define population.
9. Define sample.
10. Define qualitative characteristic.
11. Define quantitative characteristic.
12. Define attribute.
13. Give an example for attribute.
14. Define variable.
15. Define discrete variable.
16. Give an example for discrete variable.
17. Define continuous variable.
18. Give an example for continuous variable.
19. Define nominal scale.
20. Define ordinal scale.

Two mark questions:

1. Write down Prof.Horace Secrist's definition of Statistics.
2. Mention two characteristics of Statistics.
3. Mention two functions of Statistics.
4. Mention two limitations of Statistics.
5. Mention two fields where Statistics is used.
6. Mention two causes of distrust of Statistics.
7. Mention two remedies to remove distrust of Statistics.
8. Define population and sample.
9. Distinguish between qualitative and quantitative characteristics.
10. Define attribute. Give an example.
11. Define variable. Give an example.
12. Define discrete variable with the help of an example.
13. Define continuous variable with the help of an example.
14. Mention the type of variable seen in
    (a) Daily temperature. (b) Size of shoes.
15. What is meant by nominal and ordinal scales?

Five mark questions:

1. Define Horace Secresit's definition of Statistics. Explain any two of them.
2. Mention five characteristics of Statistics.
3. Mention five functions of Statistics.
4. Mention three functions and two limitations of Statistics.
5. Mention five limitations of Statistics.

UNIT – II

ORGANIZATION OF DATA

Choose the most appropriate answer from the choices given.

1. The person who conducts the statistical enquiry is
   a) Investigator b) Enumerator c) Respondent d) Informant

2. A complete enumeration of each and every unit of the population is called
   a) Pilot Survey b) Census enumeration c) Sample survey d) Sampling

3. The procedure in which every unit has an equal chance of being included in the sample is
   a) Simple random sampling b) Systematic sampling
   c) Stratified sampling d) Sampling error

4. Procedure of drawing samples by selecting equally separated units is
   a) Simple random sampling b) Systematic sampling
   c) Stratified sampling d) Sampling error

5. Procedure of drawing appropriate number of sample units from each homogeneous stratum is
   a) Simple random sampling b) Systematic sampling
   c) Stratified sampling d) Sampling error

Fill in the blanks by choosing the appropriate word from those given in the brackets.

(Primary, Enumerator, Biased, Correspondents, Census, Questionnaire, Investigator, Respondents, Unbiased, Schedule, Manipulation, Absolute)

1. The _____ is the person who conducts the statistical enquiry.
2. The person who collects the information for the investigator is called _____.
3. The _____ are the persons from whom the information will be collected.
4. Data which are collected for the first time, directly from the field by the investigator is called _____ data.
5. 5. Agents who collect information from the informants are generally called _____.
6. _____ is a list of questions where the answers are filled by the informats.
7. _____ is a list of questions where the facts will be supplied by informants and recorded by enumerator.
8. A complete enumeration of each and every unit of the population is called _____ enumeration.
9. The error that occurs at the time of analysis is called error of _____.
10. The errors that occur with the notice of the investigator are called _____ errors.
11. The errors that occur without the notice of the investigator are called _____ errors.

Match the following: (Direct answers are given)

	Investigator		The person who conducts statistical enquiry
	The data collected for the first time(directly from the field)		Primary data
	Direct personal observation		Primary data
	Indirect oral interview		Primary data
	Information through agencies		Primary data
	Mailed questionnaire		Primary data
	Schedules sent through enumerator		Primary data
	Correspondents		Agents who collect information from the informants
	Absolute error		Actual value – estimated value

One mark questions

1. What is meant by statistical enquiry?
2. Who is an investigator?
3. Who is enumerator?
4. Who is respondent?
5. Define collection of data.
6. Define primary data.
7. What is a questionnaire?
8. What is a schedule?
9. Define secondary data.
10. Give an example for published source of secondary data.
11. Give an example for unpublished source of secondary data.
12. Define census enumeration.
13. Define sample survey.
14. What is pilot survey?
15. Define sampling.
16. What is meant by simple random sampling?
17. What is meant by sampling (Statistical) error?
18. What is meant by absolute error? (Define absolute error).
19. What is meant by relative error? (Define relative error).
20. When the sampling errors are decreases?

Two mark questions:

1. Mention the two stages of statistical enquiry.
2. What is primary data? Mention a method of collecting the same.
3. Mention two methods of collecting primary data.
4. Mention the sources of secondary data.
5. Define census enumeration and sample survey.
6. Mention a merit and demerit of census enumeration.
7. Mention a merit and demerit of sample survey.
8. Mention two methods of sampling.
9. Mention two causes of sampling errors.
10. Distinguish between biased and unbiased errors.
11. Mention the methods of measurement of errors.

Five mark questions:

1. Mention the points that are to be considered in planning an enquiry.
2. Mention the points that are to be considered in execution of the survey.
3. Mention the merits and demerits of direct personal observation method of collecting primary data.
4. What are the guidelines for the construction of a questionnaire?
5. Mention any two merits and three demerits of census enumeration.
6. Mention any three merits and two demerits of sample survey.
7. Distinguish between census enumeration and sample survey.
8. Briefly explain the three methods of sampling.

UNIT – III

CLASSIFICATION AND TABULATION

Choose the most appropriate answer from the choices given.

1. Classification on the basis of variable is
   a) Chronological b) Geographical c) Qualitative d) Quantitative

2. Classification on the basis of attribute is
   a) Chronological b) Geographical c) Qualitative d) Quantitative

3. Classification of statistical data according to time is called-
   a) Quantitative classification b) Qualitative classification
   c) Chronological classification d) Geographical classification.

4. While framing a frequency distribution, if class intervals are not considered, is called
   a) Open-end frequency distribution b) Continuous frequency distribution
   c) Discrete frequency distribution d) Cumulative frequency distribution

5. In a class, if lower as well as upper limits are included in the same class, such a class is called –
   a) Inclusive class b) Exclusive class c) Open-end class d) Class mark

6. The correction factor of the class intervals: 10-19 20-29 30-39 is -
   a) 0.25 b) 0.5 c) 0.75 d) 1

7. Width of the class interval is
   a) UCL + LCL b) UCL ÷ LCL c) UCL - LCL d) UCL X LCL

8. The mid-point of the class interval 10 – 20 is-
   a) 10 b) 12.5 c) 15 d) 20

9. The mid-point of the class interval 10 – 19 is-
   a) 10.5 b) 14.5 c) 15.5 d) 19.5

10. In a table, column headings are called –
    a) Stubs b) Captions c) Head note d) Foot note

11. In a table, row headings are called –
    a) Stubs b) Captions c) Head note d) Foot note

12. 'Stub' of a table is the –
    a) Left part of the table describing the columns
    b) Right part of the table describing the columns
    c) Right part of the table describing the rows
    d) Left part of the table describing the rows.

Fill in the blanks by choosing the appropriate word from those given in the brackets.

(Frequency, Source, Chronological, Class mark, Stubs, Dichotomous, Cumulative, Discrete, Continuous, Open-end, Width, Body, f/w, Captions)

1. Classification of statistical data according to time is called _____classification.
2. The classification of units on the basis of single characteristic into two classes is called_____ classification.
3. The number of observations belongs to a class is _____.
4. _____refers to the number of times an observation repeated.
5. While framing a frequency distribution, if class intervals are not considered, is called _____frequency distribution.
6. While framing a frequency distribution, if class intervals are considered, is called _____frequency distribution.
7. In a class, if the lower or upper limit of the class is not specified such a class is called _____class.
8. The central value of a class is called _____.
9. The difference between the upper and lower limits of a class is called _____of the class.
10. The added up frequencies are called _____frequencies.
11. Frequency density is _____.
12. In a table, column headings are called _____.
13. In a table, row headings are called _____.
14. The _____of the table contains numerical data.
15. Below foot note or below the table, _____of the data may be mentioned for verification to the reader.

Match the following. (Direct answers are given)

	Classification according to time		Chronological
	Classification on the basis of attributes		Qualitative
	Classification on the basis of Variables		Quantitative
	Width of the class interval		UCL – LCL
	Central value of a class		Class mark
	Mid-point of the class 10 – 30		20
	Mid-point of the class 10 – 19		14.5
	Width of the class 30 – 40		10
	Prof. Sturges's rule		K = 1 + 3.322 log N
	Captions		Column headings
	Stubs		Row headings
	Body of the table		Contains numerical data

One mark questions

1. What is classification of the data?
2. Mention an objective of classification of data.
3. Define temporal classification.
4. Define spatial classification.
5. Define qualitative classification.
6. Define quantitative classification.
7. Define frequency.
8. Define inclusive class interval.
9. Define exclusive class interval.
10. For what purpose correction factor is used, in frequency distribution?
11. Define open-end class interval.
12. What is class midpoint?
13. Define frequency density.
14. Define relative frequency.
15. What is bi-variate frequency distribution?
16. What is tabulation of the data?
17. What is stub of a table?
18. What is caption of a table?

Five mark questions:

1. Number of teaching staff working in 20 different colleges was recorded as below:
   15, 12, 18, 10, 15, 12, 20, 25, 18, 10, 15, 12, 15 20, 25, 15, 18, 20, 15, 18
   Prepare a frequency table.

2. The number of doctors serving in forty different hospitals were recorded as below:

6	7	5	7	6	3	9	8	6	7	5	7	6	8	5	8	5	9	5	6
5	9	6	6	4	4	7	5	5	8	5	3	3	8	4	4	3	4	4	3

   Prepare a discrete frequency table.

3. In a survey of 40 families in a certain locality, the number of children per family was recorded and the following data were obtained.

1	0	3	2	1	5	6	2	2	1	0	3	4	2	5	6	3	2	1	1
3	3	2	4	2	2	3	0	2	1	4	5	3	3	4	4	5	4	2	1

   Represent the data in the form of a discrete frequency distribution.

4. Following is the data regarding the number of meteors observed in 30 different days:
   7, 4, 2, 5, 9, 7, 4, 3, 8, 6, 9, 10, 3, 3, 5, 9, 5, 7, 6, 3, 8, 4, 3, 7, 9, 8, 10, 6, 8, 7.
   Classify the above observations.

5. A review of the first 30 pages of a Statistics book reveals the following printing mistakes:

0	1	3	3	2	5	6	0	1	0	4	1	1	0	2
3	2	5	0	4	2	2	3	3	4	6	1	4	3	2

Prepare a frequency distribution of printing mistakes.

6. Following are the ages (in years) of school children:

12	5	13	12	10	11	7	9	6	10	9	13	5	10	7
14	6	11	13	7	9	8	11	10	8	12	13	9	6	14

Prepare a frequency table using inclusive class interval of width 3 years.

7. Following is the data regarding the I.Q of 30 children of a school.

106	118	112	120	103	105	99	139	65	113
100	108	100	112	110	109	117	98	103	99
108	116	93	100	120	110	95	101	105	98

Prepare a frequency distribution with class intervals: < 90, 90-110, 110-120, ≥120.

8. From the following data of the hourly wages (in rupees) of workers employed in a certain factory, construct a frequency table with classes 40-49, 50-59 and so on.

76	63	83	75	61	41	115	82	60	40	74	42
78	95	56	77	78	65	67	50	84	76	100	53
100	81	59	73	54	79	79	80	104	69	68	79
72	80	70	69	64	42	76	84	90	77	49	66
73	71	94	78	86	51	96	103	52	79	50	72

9. Weights in kg of 50 students of a college are as follows.

42	62	46	54	41	37	54	44	32	45
47	50	58	49	51	42	46	37	42	39
54	39	51	58	47	64	43	48	49	48
49	61	41	40	58	49	59	57	37	34
56	38	45	52	46	40	63	41	51	41

Prepare a frequency distribution table with suitable class intervals.

10. Given below are the daily wages in rupees of 36 workers in a factory manufacturing plastic products.

100	115	120	125	92	140	150	162	189
165	200	220	250	240	300	320	270	280
400	382	288	235	225	312	270	250	242
344	248	188	220	240	212	224	325	425

Form a frequency distribution, taking first class-interval as 90-140 and width as 50.

11. Below are given the marks obtained by a batch of 10 students in Mathematics and Statistics:

Roll No.	1	2	3	4	5	6	7	8	9	10
Marks in Mathematics	53	54	52	52	50	53	54	54	52	50
Marks in Statistics	58	55	57	56	58	57	56	59	57	55

Prepare a bi-variate frequency table.

12. Beloware the ages of husbands and wives. Prepare a bi-variate frequency distributionwith class intervals as (20-25), (25-30), … for both variables.

Age of Husband (in years)	24	42	29	43	35	41	33	36	29	38
Age of wife (in years)	25	37	25	37	23	39	23	32	24	38

13. Draw a blank table to show the students of a college according to
    i. Class: I PUC, II PUC.
    ii. Faculty: Arts, Commerce and Science.
    iii. Sex: Boys, Girls.

14. Prepare a blank table showing the distribution of students of a college according to :
    i. Faculty: Commerce, Science.
    ii. Sex: Boys and girls.
    iii. Age group (in years): Below 18, 18 - 20, 20 and above.

15. Prepare a blank table to show the distribution of students according to
    i. College: Government, Aided, Unaided.
    ii. Faculty: Science, Commerce, Arts.
    iii. Gender: Boys, Girls.

16. Prepare a blank table showing the particulars relating to the residents of a certain locality according to:
    i. Occupation: office assistants, business men, teachers, bank employees.
    ii. Sex: men and women.
    iii. Marital status: married, single.

17. Draft a blank table to show the distribution of employees of a factory according to-
    i. Sex: Men, Women
    ii. Category: Skilled, Unskilled.
    iii. Wages: Below Rs.5000, Rs.5000-10000 and Rs.10000 & above.

18. In a sample study about the literacy of residents of a village, the following data were observed. 55% of the residents were males; 85% were literates; only 12% were non-literate females. Tabulate the information.

19. In a sample study regarding smoking habit in a town, the following data were obtained:
    Men population = 58%
    Smokers = 22%
    Men smokers = 18%
    Tabulate the above data.

20. In a sample study about food habits of a town, the data was obtained:
    50 % persons were males
    30 % were non-vegetarians
    18 % male non-vegetarians
    Tabulate the above data.

21. The number of students in a college in 2005 was 510. Of these 480 were boys. In 2010 the number of boys increased by 10% and that of girls increased by 30% of that of 2005.In 2012 the total number of students in the college was 1200, the number of boys being double the number of girls. Tabulate the above information.

UNIT – IV

DIAGRAMMATIC AND GRAPHIC PRESENTATION OF DATA

Choose the most appropriate answer from the choices given.

1. Simple bar diagram is a type of,
   a) One-dimensional diagram b) Two-dimensional diagram
   c) Three-dimensional diagram d) Cartograms

2. Multiple bar diagram is a type of,
   a) One-dimensional diagram b) Two-dimensional diagram
   c) Three-dimensional diagram d) Cartograms

3. Component bar diagram is a type of,
   a) One-dimensional diagram b) Two-dimensional diagram
   c) Three-dimensional diagram d) Cartograms

4. Percentage bar diagram is a type of,
   a) One-dimensional diagram b) Two-dimensional diagram
   c) Three-dimensional diagram d) Cartograms

5. Pie-diagram diagram is a type of,
   a) One-dimensional diagram b) Two-dimensional diagram
   c) Three-dimensional diagram d) Cartograms

6. Mode of the distribution can be obtained graphically by using-
   a) Histogram b) Frequency curve c) Frequency polygon d) Ogives

7. Median of the distribution can be obtained graphically by using-
   a) Histogram b) Frequency curve c) Frequency polygon d) Ogives

8. Partition values of the distribution can be obtained graphically by using-
   a) Histogram b) Frequency curve c) Frequency polygon d) Ogives

Fill in the blanks by choosing the appropriate word from those given in the brackets.

(Continuous, histogram, cumulative, two, one, ogives, Pie-chart)

1. Multiple bar diagram is a type of _____dimensional diagram.
2. Pie-chart is a type of _____dimensional diagram.
3. Mode can be obtained graphically by using_____.
4. Median of the distribution can be obtained graphically by using_____.
5. Histogram is constructed for a _____frequency distribution.
6. The curves drawn for _____frequencies against the class limits are called ogives.

Match the following. (Direct answers are given)

	Simple bar diagram		One dimensional
	Multiple (Compound) bar diagram		One dimensional
	Component (Sub-divided) bar diagram		One dimensional
	Percentage bar diagram		One dimensional
	Pie-chart		Two dimensional diagram
	Area of the histogram		Total frequency
	Histogram		Mode of the distribution
	Graph used to find median		Ogives
	Graph used to find partition values		Ogives
	Cumulative frequency distribution		Less than ogive
	Ogives		Cumulative frequency curves

One mark questions:

1. What is one dimensional diagram?
2. Mention a type of one dimensional diagram.
3. Mention a two dimensional diagram.
4. What is a pie diagram?
5. What is Histogram?
6. Name the graph used to locate mode.
7. Name the graph used to locate median.
8. Mention a merit of a diagram.
9. Mention a merit of graph.
10. Name the average located from Histogram.

Five mark questions:

1. Represent the following data regarding the production of paddy (in '000 tons) by simple bar diagram.

Year	2005	2006	2007	2008
Production	90	85	100	105

2. Following figures represent the decadal change of population of India. Draw a simple bar diagram.

Year	1971	1981	1991	2001	2011
Population(Million)	548	688	846	1028	1210

3. The following table shows the results of II P.U.C. students of a college for the last three years, Draw a multiple bar diagram.

Year	1st class	2nd class	Pass class	Failed
2010	25	32	28	5
2011	28	25	17	10
2012	32	30	15	3

4. The production of wheat and rice of a region are given below:

Year		2005	2006	2007	2008	2009	2010
Production (in Metric tons)	Wheat	12	15	18	19	22	26
	Rice	25	30	32	36	40	45

Draw a multiple bar diagram to represent the data.

5. Following is the data showing the strength of a college in different faculties. Draw a multiple bar diagram to represent the data.

Faculty	Students in the year		
	2008	2009	2010
Arts	150	90	100
Science	120	150	140
commerce	200	250	280
Total	470	490	520

6. Following is the data regarding the strength of students of a university during 2008-10. Construct a component bar diagram.

Year	Faculty				
	Arts	Science	Commerce	Engineering	Medical
2008	200	150	50	30	20
2009	250	200	80	50	40
2010	300	250	100	80	50

7. For the following data regarding the expenditure of families A and B. Represent the data by sub-divided bar diagram.

Items		Food	Clothing	House rent	Education	Fuel	Others
Expenditure in Rupees	Family A	2580	880	2200	360	280	1800
	Family B	3350	1250	3100	1550	450	2000

8. Following data represents the major consumption of food grains in Karnataka state. Represent the data by a subdivided bar diagram.

Food Grains	Quantity Consumed (In million Tons)
Jower	450
Ragi	320
Wheat	150
Rice	400

9. The following data relates to the monthly expenditure (in Rs.) of two families A and B.

Items of expenditure	Expenditure (in Rs)	
	Family A	Family B
Food	2000	2500
Clothing	1000	2000
Rent	800	1000
Light & Fuel	400	500
Miscellaneous	800	2000

Represent the data by a rectangular diagram on percentage basis.

10. Following are the marks obtained by two students A and B in an annual examination. Represent the data by percentage bar diagram.

Subjects	Marks of students	
	Student A	Student B
Language	72	82
English	85	92
Statistics	97	95
Economics	88	90
Business studies	90	87
Accountancy	94	98
Total	526	544

11. Percentage breakup of the cost of construction of a house in Bangalore (Excluding land cost) is given below : Labour: 20% , Bricks:12%, Cement:20%, Steel:15%, Wood:13%, Supervision:15%. Other expenses: 5%. Construct a pie diagram.

12. For the following data regarding the income of the government from different sources, draw a pie diagram:

Source	Customs	Excise	Income tax	Corporate tax	Miscellaneous
Revenue (in Million Rs.)	80	190	160	75	35

13. The following table shows the cost structure of Indian Hotel Industry in percentages.

Cost components	Administrative expense	Employees payments	Repairs and maintenance	Food and Beverages	Electricity	Selling expenses
Total expenses (%)	30	20	12	16	14	8

Draw a Pie diagram to represent the data.

14. Draw a histogram from the following data and locate mode:

C.I	0-10	10-20	20-30	30-40	40-50
f	13	17	15	13	10

15. Draw a histogram for the following data.

Wages (000's Rs.)	2- 4	5 - 7	8 - 10	11 - 13	14 - 16	17 - 19	20 - 22	23 - 25
No. of workers	2	6	8	25	40	30	20	8

16. Draw a histogram for the following data and hence locate the value of mode.

Marks	0-5	5 - 10	10-20	20-30	30-40	40-50	50-70	70-80
No. of students	2	6	8	25	40	30	20	8

17. Draw a histogram and then obtain frequency polygon from histogram.

Daily wages (in Rs.)	100-150	150-200	200-250	250-300	300-350	350-400
No. of workers	7	19	27	15	12	8

18. Draw a frequency polygon to the following frequency distribution.

Mid-points	15	25	35	45	55	65	75
Frequency	5	12	25	18	10	6	2

19. Draw histogram, frequency polygon and then obtain frequency curve from thefollowing frequency distribution.

C.I	10-20	20-30	30-40	40-50	50-60
f	2	5	12	7	4

20. Draw frequency curve from the following frequency distribution.

Marks	0-10	10-20	20-30	30-40	40-50
No. of students	5	14	20	16	8

21. Draw a less than Ogive for the following distribution and locate the median from the graph.

Daily wages Below Rs.	250	260	270	280	290	300	310	320	330	340
No. of workers	6	16	38	70	110	154	192	218	228	250

22. Draw a less than Ogive and locate the median from the graph.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	3	9	15	30	18	5

23. Draw Ogive from the following data and measure the median value.

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	5	11	21	16	10

24. Draw less than and more than Ogives to the following frequency distribution and hence, locate the value of median.

Classes	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequencies	3	8	14	25	15	7	2

25. Draw less than and more than Ogives to the following frequency distribution.

Class	20-24	24-28	28-32	32-36	36-40	40-44
Frequency	17	25	40	23	12	8

26. From the following data, draw a less than ogive and locate the values of Q_1 and Q_3 Graphically.

Marks	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60
No. of students	5	13	24	39	52	60

UNIT – V

ANALYSIS OF UNIVARIATE DATA

Choose the most appropriate answer from the choices given.

1. The algebraic sum of deviations of a given set of observations taken from their mean is-
   a) 0 b) 1 c) 2 d)3

2. The Median of the variate values 10, 12, 15, 18, 20 is:
   a) 12 b) 15 c) 17 d) 19

3. The Mode of the variate values 8, 9, 8, 7, 8 is:
   a) 6 b) 7 c) 8 d) 9

4. In a moderately skewed distribution, the relation among the value of mean, median and mode is-
   a) Mode = 2Median – 3Mean b) Mode = Median – 3Mean
   c) Mode = 2Median – Mean d) Mode = 3Median – 2Mean

5. The geometric mean of 4 and 16 is,
   a) 5 b) 6 c) 8 d) 10

6. The G.M. of 8, 4, 2 is,
   a) 4 b) 2 c) 8 d) 6

7. Geometric mean of 4, 0, 6 and 8 is
   a) 4 b) 0 c) 6 d) 8

8. Measures which divide the data into four equal parts are known as –
   a) Quartiles b) Deciles c) Percentiles d) Median

9. Measures which divide the data into ten equal parts are known as –
   a) Quartiles b) Deciles c) Percentiles d) Median

10. Measures which divide the data into 100 equal parts are known as –
    a) Quartiles b) Deciles c) Percentiles d) Median

11. If $Q_2 = 40$, the value of D_5 is:
    a) 10 b) 20 c) 30 d) 40

12. If $D_5 = 30$, the value of P_{50} is:
    a) 10 b) 20 c) 30 d) 40

13. If $Q_2 = 70$, the value of P_{50} is:
    a) 50 b) 70 c) 80 d) 90

14. Formula for range (R) of a set of values is –
    a) H – L b) H + L c) L – H d) H ÷ L

15. The range of the variate values 10, 20, 15, 30, 35 is:
    a) 10 b) 15 c) 20 d) 25

Fill in the blanks by choosing the appropriate word from those given in the brackets.

(Quartiles, Least, 0, 3, Quartile, Median, Percentiles, Bell, Deciles, Mode, Symmetric, Partition, 3M - 2$\bar{x}$)

1. The algebraic sum of deviations of a given set of observations taken from their mean is _____.
2. The sum of squares of deviations from their arithmetic mean is _____.
3. _____is the middle most value of a data when they are arranged in an order.
4. _____is a value which occurs most frequently in a set of observations.
5. Empirical relation between mean, median and mode is Z = _____
6. Measures which divide a given data into equal parts are known as _____values.
7. Measures which divide the data into four equal parts are known as _____.
8. Measures which divide the data into ten equal parts are known as _____.
9. Measures which divide the data into 100 equal parts are known as _____.
10. _____deviation is known as half of the inter quartile range.
11. When the symmetric distribution is plotted on a graph, we get _____shaped curve.
12. In a _____ distribution, mean, median and mode are equal.
13. For a mesokurtic distribution, the value of β_2 is _____.
14. For a leptokurtic distribution, the value of β_2 is greater than _____.
15. For a platykurtic distribution, the value of β_2 is lesser than _____.

Match the following. (Direct answers are given)

	$\Sigma (x - \bar{x})$		0
	$\Sigma (x - \bar{x})^2$ is		Least
	Mode		3Median – 2Mean
	Average growth rate		Geometric mean
	Average speed		Harmonic mean
	Quartiles		Divide the data into 4 equal parts
	Deciles		Divide the data into 10 equal parts
	Percentiles		Divide the data into 100 equal parts
	Range		H – L
	Inter quartile range		$Q_3 - Q_1$
	Asymmetry (Lack of symmetry)		Skewness
	Kurtosis		Peakedness
	$\beta_2 > 3$		Leptokurtic distribution
	$\beta_2 = 3$		Mesokurtic distribution
	$\beta_2 < 3$		Platykurtic distribution

One Mark Questions:

1. What is meant by 'central tendency'?
2. What is meant by 'measure of central tendency'?
3. Mention any one objective of average.
4. Define arithmetic mean.
5. Define Median.
6. Define Mode.
7. What is uni-modal distribution?
8. Define geometric mean.
9. Define harmonic mean.
10. State the minimal property of mean.
11. What is the value of $\sum(X-\bar{X})$?
12. Find mode for the following data: 3, 4, 5, 5, 6, 8, 5, 7, 5, 5, 8, 5, 5, 4, 5.
13. Calculate mode for the following distribution.

x	10	12	15	22	25	35	45	50	60
f	4	6	10	14	20	18	10	6	3

14. Find the geometric mean of 4, 25.
15. How AM, GM , HM are related?
16. Give the empirical relationship among$\bar{X}$, M , Z.
17. Name an average suitable for qualitative data.
18. What are partition values?
19. Define quartiles.
20. Define deciles.
21. Define percentiles.
22. If median is 50, what is the value of Q_2?
23. What is the relationship between median, Q_2, D_5 and P_{50}?
24. What is dispersion?
25. Define Range.
26. If X: 7, 12, 25, 18, 35 then find range.
27. Define Quartile deviation.
28. Define Mean deviation.
29. Define Standard deviation.
30. What is coefficient of variation?
31. Define variance.
32. If SD = 4 cms, find variance.
33. If variance = 16 Sq. feet, find SD.
34. Define Skewness?
35. What is the relationship among mean, Median and mode for a symmetrical distribution?
36. Define Kurtosis.
37. Name the kurtosis if $\beta_2 > 3$.
38. Name the kurtosis if $\beta_2 = 3$.
39. What is the value of β_2 if the curve is Platykurtic?

Two Mark Questions:

1. Mention two desired qualities of average.
2. Mention the different measures of average.
3. Which average would be suitable in the following cases?
   a. Average size of ready-made garments.
   b. Average rate of growth of population per decade.
4. Which average would be suitable in the following cases?
   a. Average marks of student in a class.
   b. Average Speed of 4 participants in a 4 x 100 m relay race.
5. State the properties of Arithmetic mean.
6. Mention a merit and demerit of A.M.
7. Mention a merit and demerit of Median.
8. Mention a merit and demerit of Mode.
9. Find the AM of 8, 5, 6, 4, 3, 7, 2.
10. If mean of 50 observations is 70. Find the sum of observations.
11. If sum of 15 observations is 450. Find its mean.
12. Given n1=50, n2=100, $\bar{X}1$= 60, $\bar{X}_2$ = 70, find combined mean.
13. The mean age of the first group of 80 boys is 10years and that of the second group of 20 boys is 15years. Find the AM of the two groups together.
14. Find median for the following data. 17, 32, 35, 33, 15, 21, 41, 32, 11, 18, 20.
15. Find median for the following data: 5, 9, 8, 6, 1, 4, 10, 8.
16. The arithmetic mean and the median of a slightly skewed distribution are 11cms and 11.7cms respectively. Find the mode of the distribution.
17. In a frequency distribution, if mean = 24.6 and mode = 26.1, find the value of median.
18. In a moderately skewed distribution, the values of mode and median are 20 and 24 respectively. Find the mean.
19. Find GM of 1, 4 and 16.
20. Find the HM of 1,4,16.
21. For the following data compute coefficient of range.
    Height (cms): 160, 158, 159, 165, 148, 139, 142, 155.
22. Mention the different measures of dispersion.
23. What are absolute and relative measures of dispersion?
24. State two merits of S.D.
25. State two demerits of Q.D.
26. State two demerits of M.D.
27. If quartile deviation is 7 and Q_1=21. Find Q_3.
28. For a distribution, if the sum of the lower and upper quartiles is 50 and their difference is 10, find the relative measure of quartile deviation.
29. If mean is 20 and SD is 5, find CV.
30. Find mean if CV=10% and SD=4.
31. If coefficient of variation and standard deviation of a distribution are 75% and 15 respectively, find its mean.
32. Mention the two types of moments.
33. Mention two properties of standard deviation.
34. For a moderately skewed distribution, arithmetic mean = 160, mode = 157 and standard deviation = 50, find coefficient of Skewness.

Five Mark Questions:

1. Compute AM for the following data.

x	2	3	4	5	6	7	8	9	10	11
f	3	8	10	12	16	14	10	8	7	5

2. Find mean for the following frequency distribution.

x	19	21	23	25	27	29	31
f	13	15	16	18	16	15	13

3. Find mean for the following frequency distribution.

Marks	10 – 25	25 – 40	40 – 55	55 – 70	70 – 85	85 – 100
No. of students	6	50	44	26	3	1

4. Calculate mean for the following distribution.

C.I	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39	40 – 44	45 – 49	50 – 54	55 – 59	60 – 64
f	6	14	12	10	10	9	9	10	6	4

5. Compute mean for the following distribution.

Marks	Below 10	Below 20	Below 30	Below 40	Below 50
No. of students	3	8	17	20	22

6. Calculate AM for the following frequency distribution.

Height (Cms)	135 & more	140 & more	145 & more	150 & more	155 & more	160 & more	165 & more	170 & more
No. of students	100	96	87	69	41	17	7	2

7. The mean of the following data is 20.5. Find the missing frequency.

x	10	15	20	25	30
f	5	7	–	12	6

8. Given mean = 30.5 for the following distribution, find the missing frequency.

x	10	20	30	40	50
f	8	10	-	15	7

9. The mean of the following distribution is 50. But frequency with respect to class interval (60 – 80) is missing. Find the missing frequency.

C.I	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
f	19	28	32	–	19

10. For the following distribution if $\bar{x} = 45$, find the missing frequency.

C.I	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
f	5	8	7	-	28	20	10	10

11. In an examination, a candidate scores the following marks (in percentage). Eng (62), Language (74), Mathematics (58), Science (61), Social Science (45). Find the candidates weighted mean if the respective weights are 3, 4, 4, 5 and 2.

12. The AM of 50 observations was 100. At the time of calculations, two values were wrongly taken as 14 and 18 instead of 40 and 80. Find the correct mean.

13. The mean marks of students in 2 sections 'A' and 'B' of a class is 62. The mean mark of students in section 'A' is 70. If the number of students in section 'A' and section 'B' are 30 and 35 respectively, then find the mean marks of students in section 'B'.

14. The average monthly salary of employees of a company was Rs.20,000. The average monthly salaries of male and female employees were Rs.20,800 and Rs.16,800 respectively. Find the percentage of male and female employees of the company.
15. The mean marks of all the students in a class are 72. If the mean marks of boys are 75 and that of girls is 65. Find the proportion of boys and girls in the class.

16. From the following data find median.

Daily wage (Rs.)	120 – 140	140 – 160	160 – 180	180 – 200	200 – 220	220 – 240	240 – 260
No. of employees	8	12	20	30	22	18	10

17. For the following frequency distribution of weight of mangoes, find median.

Weight (gms)	410 – 419	420 – 429	430 – 439	440 – 449	450 – 459	460 – 469	470 – 479
No. of mangoes	10	20	42	54	45	18	7

18. The following table shows the age distribution of persons in a particular region. Find median age.

Age (years)	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60	Below 70
No. of persons ('000)	2	7	16	28	30	45	48

19. The median of the following distribution is 24, find the missing frequency.

C.I	0-10	10-20	20-30	30-40	40-50
f	5	25	-	18	7

20. Find the mode from the data given below.

x	05	10	15	20	25
f	3	2	8	6	1

21. Calculate mode for the following frequency distribution.

Income (in 000's Rs.)	1 – 2	2 – 3	3 – 4	4 – 5	5 – 6	6 – 7
No. of workers	15	18	30	17	18	12

22. Below is given the frequency distribution of weights of a group of 60 students of a class in a school. Find the modal weight.

Weight(in kg)	30-34	35-39	40-44	45-49	50-54	55-59	60-64
No of students	3	5	12	18	14	6	2

23. Calculate the mode for the following distribution.

C.I	Below10	10-12	12-14	14-16	16-18	18 & above
f	3	15	27	20	3	2

24. From the following distribution of hourly wage (in rupees) of firm employees, find the modal hourly wage.

Hourly wage(Rs.)	<10	<20	<30	<40	<50	<60	<70	< 80
No. of employees	2	15	60	82	95	122	140	150

25. Calculate the geometric mean from the following data.

Diameter (mm)	130	135	140	145	146	148	149
No. of screws	3	4	6	6	3	5	2

26. Calculate GM for the data given below:

C.I	20-30	30-40	40-50	50-60	60-70	70-80
f	7	23	30	22	11	7

27. Calculate the Harmonic mean for the following data.

x	12	14	16	18	20
f	3	5	9	4	2

28. Find HM for the following data.

C.I	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
f	10	5	8	7	4

29. In a certain factory, a unit of work is completed by A in 5 minutes, B in 6 minutes, C in 8 minutes, D in 9 minutes and E in 12 minutes. Find the average time to complete the unit of work?

30. A cyclist covers his first two miles at a speed of 5 miles per hour, another two miles at 4 miles per hour and the last two miles at 3 miles per hour. Find the average speed for entire journey.

31. For the values 1, 4 and 16 show that AM > GM > HM.

32. If X: 4, 4 . Show that AM = GM = HM.

33. Calculate lower quartile, upper quartile and 8^{th} decile for the following data.
22, 26, 14, 30, 18, 11, 35, 41, 12, 32.

34. Calculate the first quartile and sixth decile from the following data.

x	58	59	60	61	62	63	64	65	66
f	2	3	6	15	10	5	4	3	2

35. Find the 9^{th} decile and 55^{th} percentile for the following distribution.

C.I	1-3	3-5	5-7	7-9	9-11	11-13	13-15	15-17
f	6	53	85	56	21	16	4	4

36. Calculate Inter quartile range and semi inter quartile range for the following data
11, 15, 16, 9, 14, 19, 10, 12, 8, 17, 20, 23, 22.

37. Compute coefficient of Q.D. from the data given below.

x	2	4	6	8	10	12
f	3	5	10	12	6	4

38. Calculate semi-inter quartile range and its relative measure for the data given below.

Age (Yrs)	20	30	40	50	60	70	80
No. of Persons	03	61	132	153	140	51	03

39. Calculate Coefficient of Q.D. for the following distribution.

Wages (Rs.)	60-64	64-68	68-72	72-76	76-80	80-84	84-88
No. of workers	12	18	16	14	12	8	8

40. Find semi-inter quartile range for the following distribution.

Age (years)	Less than 25	Less than 30	Less than 35	Less than 40	Less than 45	Less than 50	Less than 55
No. of Employees	10	25	75	130	170	189	200

41. Calculate mean deviation from mean and its Coefficient for the following data.
100, 150, 200, 360, 490, 500, 600.

42. Calculate the mean deviation from mean from the following data.

Variable	10	11	12	13
f	3	12	18	12

43. Find mean deviation from mean for the following distribution.

Height(Inches)	60	61	62	63	64	65	66	67	68
No. of persons	2	1	14	29	25	12	10	4	2

44. Find M.D from mean for the following distribution regarding difference in age (yrs) among couples of a particular community.

Difference (yrs)	0-2	2-4	4-6	6-8	8-10	10-12
No. of couples	220	345	452	280	63	10

45. Calculate the mean deviation from the mean for the following distribution.

C.I	2 – 4	4 – 6	6 – 8	8 – 10	10 – 12
f	3	5	8	4	2

46. Calculate M.D from median and its relative measure for the following data.
37, 45, 52, 46, 56, 40, 47, 55, 43.

47. Calculate coefficient of M.D from Median for the following frequency distribution.

x	5	6	7	8	9	10
f	8	12	18	8	2	1

48. Calculate coefficient of mean deviation from median for the following distribution.

Age(Yrs)	16	17	18	19	20	21	22	23	24
No. of persons	4	5	7	12	20	13	5	0	4

49. Compute coefficient of M.D from median for the following distribution.

Marks	Below 10	Below 20	Below 30	Below 40	Below 50
No. of students	3	8	17	20	25

50. Marks of ten students in a certain test (out of 10) are as follows .compute M.D and its Co-efficient from mode: 7, 4, 10, 9, 15, 12, 7, 9, 7, and 18.

51. Compute M.D from mode for the data given below:

x	0	1	2	3	4	5	6
f	18	22	35	25	20	12	2

52. Compute Mean deviation from mode for the following distribution regarding profit (Rs.) of various firms.

Profit (in '000 Rs.)	20-40	40-60	60-80	80-100	100-120
No. of firms	16	19	41	24	15

53. Find standard deviation of the following data: 25, 50, 45, 30, 70, 42, 36, 48, 34, 60.

54. Find standard deviation of the first five even natural numbers.

55. The mean and standard deviation of a distribution of 100 and 150 items are 50, 5 and 40, 6 respectively. Find the standard deviation of all the 250 items taken together.

56. Calculate standard deviation for the following distribution.

x	8	11	17	20	25	30	35
f	2	3	4	1	5	7	3

57. Calculate variance for the following distribution.

x	4	5	6	7	8	9	10
f	6	12	15	28	29	14	15

58. Find standard deviation and variance from the following data.

C.I.	0-6	6-12	12-18	18-24	24-30	30-36	36-42
f	19	25	36	72	51	43	28

59. Find the combined SD from the following table.

	Sample I	Sample II
No. of observations	50	100
Mean	54.1	50.3
S D	8	7

60. The arithmetic mean of marks scored by 3 students A, B &C in a examination are 50, 44, 20 respectively. The standard deviations of marks are respectively 15, 11 and 3. Who is the most consistent scorer?

Ten mark questions

1. Find median and mode for the following distribution.

C.I	200-400	400-600	600-800	800-1000	1000-1200	1200-1400
f	6	9	15	10	7	3

2. Find standard deviation, variance and coefficient of variation from the following data.

Wage (Rs)	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60	Less than 70	Less than 80
No. of persons	12	30	65	107	157	202	222	230

3. The number of runs scored by two batsmen A and B in different innings is as follows:

A	12	115	6	73	7	19	119	36	84	29
B	47	12	76	42	4	51	37	48	13	0

Who is better run scorer? Who is more consistent?

4. Following is the distribution of weights of students. Compare their coefficient of variations.

Weights (Kgs)		20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
No. of Students	Class A	7	10	20	18	7
	Class B	5	9	21	15	6

5. Compute Karl Pearson's coefficient of skewness for the following distribution.

Marks	> 0	> 10	> 20	> 30	> 40	> 50	> 60	> 70	> 80
No. of students	150	140	100	80	80	70	30	14	0

6. Calculate Karl-Pearson' s coefficient of skewness from the following data.

C.I.	70-80	60-70	50-60	40-50	30-40	20-30	10-20	0-10
f	11	12	30	35	21	11	6	5

7. Calculate Pearson's coefficient of skewness from the following.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of students	10	40	20	0	10	40	16	14

8. Calculate Bowley's coefficient of skewness from the data given below.

C.I.	30-40	40-50	50-60	60-70	70-80	80-90	90-100
f	1	3	11	21	43	32	9

9. Compute the coefficient of skewness based on quartiles.

C.I.	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89
f	5	9	14	20	25	15	8	4

10. Calculate Bowley's coefficient of skewness for the following data.

Capital (lakh Rs)	1 – 5	6 – 10	10 – 15	16 – 20	20 – 25	26 – 30	31 – 35
No.of companies	20	27	29	38	48	53	70

UNIT – VI

ANALYSIS OF BIVARIATE DATA

Two mark questions:

1. Mention two types of correlation.
2. Mention various methods of computing correlation.
3. Draw a scatter diagram to show positive correlation between two variables.
4. Draw a scatter diagram to show that there exists perfect negative correlation between two variables.
5. Define the term 'correlation'. Give an example.
6. What is 'positive correlation'? Give an example.
7. Mention which type of correlation is associated with
   a) Production and price of vegetable.
   b) Production of pigs and the production of the pig-iron.
8. Mention two uses of the study of correlation.
9. Mention two merits of scatter diagrams.
10. Mention two properties of γ.
11. In a bi-variate data, Cov(x,y)=V(x)=V(y). Find γ_{xy} and conclude.
12. Write the formula for Spearman's coefficient of rank correlation when one rankrepeats 'm' times.
13. Mention two merits of Spearman's coefficient of rank correlation.
14. In a bi-variate data on x and y, Var(x) = 9, Var(y) = 49 and Cov(x, y) = 20. Find γ.
15. Given, Cov (X , Y) = -100 , V(x) = 400 and S.D(y) = 5 . Find γ.
16. In a bivariate data covariance is 20, variances are 25 and 36 respectively. Find γ.
17. If $\sum(x-\bar{x})^2$= 6000, $\sum(y-\bar{y})^2$= 920 and$\sum(x-\bar{x})(y-\bar{y})$ = 240, Find γ.
18. Coefficient of correlation between two variables 'x' and 'y' is 0.32. Their covariance is 10.56. The variance of x is 9. Find Standard deviation of γ.
19. If n=9 and Σd^2 = 24, find the coefficient of rank correlation.
20. Mention two properties of regression coefficients.
21. Prove that $\gamma = \pm\sqrt{b_{xy}b_{yx}}$.
22. Mention two uses of regression analysis.
23. Mention the properties of the regression lines.
24. If γ = 0.4, σ_x = 12, σ_y= 15, find the value of b_{xy}.
25. If γ = 0.5, σ_x = 10, σ_y= 15, find the value of b_{yx}.
26. If b_{xy} =0.5 S.D (x) =4 S.D(Y)=5, find γ.
27. If b_{xy} =0.6, γ =0.75, S.D(X)= 3 find S.D(Y).

Five mark questions:

1. Draw a scatter diagram for the data given below and interpret.

x	15	18	20	19	14	12	22	11
y	14	16	13	15	18	18	11	20

2. Draw a scatter diagram for the data given below and interpret.

x	50	100	150	200	250	300	350
y	12	14	13	14	16	18	19

3. Calculate Pearson's coefficient of correlation from the following data.

x	12	9	8	10	11	13	7
y	14	8	6	9	11	12	3

4. Calculate Pearson's coefficient of correlation from the following data.

x	40	42	46	48	50	56
y	10	12	15	23	27	30

5. Calculate Karl Pearson's coefficient of correlation from the following data.

x	36	41	46	59	46	65	31	68	41	70
y	48	60	53	36	50	42	66	44	58	65

6. Calculate the coefficient of correlation by Karl Pearson's method from the following data relating to overhead expenses and cost of production.

Overheads('000Rs)	80	90	100	110	120	130	140	150	160
Cost('000Rs)	15	15	16	19	17	18	16	18	19

7. Following are the marks of 8 students in Statistics and Mathematics. Find coefficient of rank correlation.

Marks in Statistics	25	43	27	35	54	61	37	45
Marks in Mathematics	35	47	20	37	63	54	28	40

8. Following are the ranks given by two Judges regarding exhibits of paintings. Find the Spearman's coefficient of rank correlation.

Paintings	1	2	3	4	5	6
I judge	6	2	1	3	5	4
II Judge	4	1	3	5	6	2

9. Calculate the coefficient of rank correlation from the following data.

x	80	78	75	75	68	67	60	59
y	12	13	14	14	14	16	15	17

10. The following data relate marks in Accountancy and Statistics.

Marks in Accountancy	78	82	78	62	46	52	57	57	58	57
Marks in Statistics	68	81	73	64	52	56	48	68	73	78

Calculate Spearman's coefficient of correlation and interpret its value.

11. Mention five differences between correlation and regression analysis.

12. The following figures relate to years of service and income (in thousands of rupees) of the employees of an organization. Considering the preferential ranks, compute the product moment rank correlation.

Length of service (years)	3	7	9	1	8	6	10	4	5	2
Income (000' of Rs.)	7	5	3	2	6	4	8	10	9	1

13. Find the regression equation of y on x and predict the average value of y when x is 9.

x	3	6	5	4	4	6	7	5
y	3	2	3	5	3	6	6	4

14. From the following data regarding the age of husband and the age of wife, estimate the age of husband when the age of wife is 16 years.

Husband's age (Yrs.)	36	23	27	28	28	29	30	31	33	35
Wife's age (Yrs.)	29	18	20	22	27	21	29	27	29	28

15. You are given with the following information about the expenditure on advertisement and sales:

	Advertisement Expenditure (Crore Rs.)	Sales (Crore Rs.)
Mean	20	120
S.D	5	2

Correlation coefficient = 0.8

I. Obtain the two regression equations.
II. Find the likely sales when the expenditure on advertisement is Rs.25 crores.

16. Following are the details of the marks scored by students in kannada and English examination. Coefficient of correlation = 0.3

	kannada	English
Mean	40	50
S.D	10	16

Estimate the marks in Kannada when the scores in English is 30.

17. The regression equations of a bi-variate distribution are:
Regression equation of y on x is $4y = 9x+15$
Regression equation of x on y is $25x = 6y+7$, Find $\bar{X}, \bar{Y}$ and γ.

18. In a laboratory experiment on correlation research study, the equation to the two regression lines was found to be $2x-y+1=0$ and $3x-2y+7=0$. Find the means of x and y. Also, workout the values of regression coefficients and the coefficient of correlation between the two variables x and y.

Ten mark questions:

1. Calculate the coefficient of correlation between the number of male children and the number of female children from the following data.

No. of male children	No. of female children				
	0	1	2	3	4
0	3	4	2	-	-
1	4	8	8	2	-
2	-	7	12	8	4
3	-	3	8	8	5
4	-	-	3	5	6

2. Calculate Karl Pearson's coefficient of correlation.

x \ y	20 – 29	30 – 39	40 – 49	50 – 59
10 – 14	10	10	-	-
14 – 18	-	20	8	-
18 – 22	-	10	25	6
22 – 26	-	-	7	4

3. Calculate Karl Pearson's coefficient of correlation from the data given below :

Marks	Age in years				
	18	19	20	21	22
20 – 25	3	2	-	-	-
15 – 20	-	5	4	-	-
10 – 15	-	-	7	10	-
5 – 10	-	-	-	3	2
0 – 5	-	-	-	3	1

4. Following are the marks of 8 students in Statistics and Mathematics s and. Estimate the marks of a student in statistics who has scored 50 marks in Mathematic and estimate the marks of a student in mathematics who has scored 60 in statistics

Marks in Statistics	25	43	27	35	54	61	37	45
Marks in Mathematics	35	47	20	37	63	54	28	40

5. Find the two regression equations from the following data.

x	3	6	5	4	4	6	7	5
y	3	2	3	5	3	6	6	4

Also find correlation coefficient γ_{xy}.

6. Given the following information about expenditure on advertisement (crores) and sales (crores)

	Advertisement expenditure	Sales
Mean	20	120
S.D	5	2

Correlation coefficient = 0.3

(a) Obtain the two regression equations
(b) Estimate the sales when the expenditure on advertisement is Rs.25 crores.
(c) Estimate the budget on advertisement if the sales are Rs. 150 crores.

7. Calculate the two regression co-efficients from the following bi-variate table and determine the value of γ.

Y / X	0 – 10	10 – 20	20 – 30	30 – 40
10 – 20	5	4	3	-
20 – 30	7	6	7	6
30 – 40	-	5	-	7

8. Obtain the regression line of x on y for the following bi-variate frequency distribution.

Sales revenue (in '000 Rs)	Advertisement expenditure (in '000 Rs)			
	5 – 15	15 – 25	25 – 35	35 – 45
75 – 125	4	1	-	-
125 – 175	7	6	2	1
175 – 225	1	3	4	2
225 – 275	1	1	3	4

UNIT – VII

ASSOCIATION OF ATTRIBUTES

Two mark questions:

1. What is meant by association of attribute? Name the different methods of measurement?
2. What is the difference between coefficient of correlation and association of attributes?
3. Write the formula of Yule's coefficient of Association with its range.

Five mark questions:

1. Calculate Yule's coefficient of association between marriage and result of students from the following data pertaining to 525 students.

	Pass	Fail
Married	90	65
Unmarried	260	110

2. Eighty eight residents of a city were interviewed during a sample survey and were classified according to smoking and tea drinking habits. Calculate Yule's coefficient of association and comment on its value.

	Smokers	Non-smokers
Tea drinkers	40	33
Non tea drinkers	3	12

3. From the following table find if there is any association between usage of credit card and expenditure, using Yule's coefficient.

	Credit card	No credit card
Expenses	225	50
No Expenses	75	I50

4. Compute Yule's coefficient of Association from the following data.
(AB) = 150, N = 1000, (A) = 200, (B) = 300.

5. Compute Yule's co-efficient of Association from the following data.
N = 250, (Aβ) = 70, (A) = 100, (B) = 50.

6. Given, N = 500, (αβ) = 280, (A) = 160 and (B) = 200. Calculate Yule's coefficient of Association.

7. Given, N = 2500, (AB) = 400, (α) = 2100 and (β) = 900. Calculate Yule's coefficient of Association.

8. Prepare a nine square with the following information. Calculate the Yule's Coefficient of Association and interpret the result. (A)=450, (B)=600, (Aβ)=100, N=1000.

9. Find the association between intelligence of fathers and the intelligence of sons from the following data :
Intelligent fathers with intelligent sons : 50
Dull fathers with intelligent sons : 100
Dull fathers with dull sons : 300
Intelligent fathers with dull sons : 200

10. 2000 candidates appeared for a competitive examination. 400 cleared the exam. 350 of them had attended a coaching class, out of which 200 had cleared the exam. Conclude regarding the effectiveness of coaching classes, by using Yule's coefficient of Association.

11. 200 candidates appeared for II PUC Examination in a college and 60 of them passed in distinction. 35 had received special coaching in college and out of them 20 candidates passed in distinction. Using Yule's co-efficient, discuss whether the Special coaching is effective or not.

12. In a collage there are 200 students, out of which 150 are boys. In an examination 120 of the students passed. 10 of the girls failed. Using Yule's coefficient find if there is any association between gender and passing of the examination.

UNIT – VIII

INTERPOLATION AND EXTRAPOLATION

One mark questions

1. What is interpolation?
2. What is extrapolation?
3. Write an assumption made in interpolation.
4. Mention one method of interpolation.

Five mark questions:

1. From the following data interpolate the export of handlooms during 2008.

Year	1998	2000	2002	2004	2006	2008	2010
Export of handlooms (Rs. In crores)	10	13	15	23	26	–	32

2. Interpolate the missing figure from the following table.

Year	2001	2002	2003	2004	2005	2006	2007
Sales ('000 Rs.)	100	120	150	180	210	–	320

3. From the given data interpolate the missing price of a commodity.

Year	2006	2007	2008	2009	2010
Price(Rs)	278	281	–	313	322

4. From the following data interpolate the production of cement in 2007.

Year	2005	2006	2007	2008	2009	2010
Production (lakh tons)	44	90	–	160	270	390

5. Using binomial expansion, ascertain the missing index number from the following data.

Year	2011	2012	2013	2014	2015
Index No.	100	107	?	157	212

6. Extrapolate the sales of a business concern for the year 2015 from the given data.

Year	2010	2011	2012	2013	2014	2015
Sales (000)	13	19	25	38	65	?

7. Following data gives profit of a company for different years. Interpolate the profit for 2014.

Year	2006	2008	2010	2012	2014	2016
Profit (crores)	6	10	12	16	-	24

8. Interpolate the missing value for the year 2005 from the following data.

Year	1995	2000	2005	2010	2015
Value	100	150	?	175	200

9. Extrapolate the value of Y when X = 50 from the below data.

X	10	20	30	40	50
Y	110	90	80	60	?

10. Using binomial expansion method, find the missing value from the following data.

Month	Jan	Feb	Mar	April	May
Value	230	260	350	?	430

UNIT – IX

PROBABILIY THEORY

Choose the most appropriate answer from the choices given.

1. Probability of an event can take values
   a) $-\infty$ to ∞ b) $-\infty$ to 1 c) -1 to 1 d) 0 to 1

2. The range of probability is
   a) [0, 1] b) [0.5, 0] c) [0, 0.5] d) [0.5, 1]

3. The probability of set of all possible outcomes of a random experiment is always equal to
   a) Infinity b) Zero c) One d) None of these.

4. The probability of the intersection of two mutually exclusive events is always
   a) Infinity b) Zero c) One d) None of these.

5. A jar contains 24 marbles, in which some are green and some are blue. If the probability of a green marble is $\frac{2}{3}$, what is the number of green marbles in the jar?
   a) 16 b) 8 c) 2 d) 24

6. A jar contains 24 marbles, in which some are green and some are blue. If the probability of a green marble is $\frac{2}{3}$, what is the number of blue marbles in the jar?
   a) 16 b) 8 c) 2 d) 24

7. If the probability of two mutually exclusive events are 0.2 and 0.4, the probability of occurrence of at least one of these events is
   a) 0.2 b) 0.3 c) 0.4 d) 0.6

8. The probability that a leap year will have 53 Sundays is
   a) $\frac{1}{7}$ b) $\frac{2}{7}$ c) $\frac{2}{53}$ d) $\frac{52}{53}$

9. The probability that a non-leap year will have 53 Sundays is
   a) $\frac{1}{7}$ b) $\frac{2}{7}$ c) $\frac{2}{53}$ d) $\frac{52}{53}$

10. If A, B and C are three independent events, the probability of their joint occurrence is
    a) $P(A)\times P(B)\times P(C)$ b) $\frac{1}{P(A)\times P(B)\times P(C)}$
    c) $P(A)+P(B)+P(C)$ d) $P(A)\,|\,P(B).P(C)$

11. If it is known that an event A has occurred, the probability of an event 'B given A' is called
    a) Empirical probability
    b) A priori probability
    c) Posteriori probability
    d) Conditional probability

Fill in the blanks by choosing the appropriate word from those given in the brackets.

(**0, 0 and 1, 0.3, 0.5, 0.6, 1, 4, 36, Simple, Random, Sample, Chance, Outcomes, Non-occurrence, An event, Compound, Null**)

1. Probability is a numerical measure of _____of occurrence of an event.
2. An experiment whose outcome is not always unique is a _____experiment.
3. The set of all possible outcomes of a random experiment is a _____space.
4. An event is a set of _____of a random experiment.
5. A set of outcomes of a random experiment is _____.
6. An event which does not contain any outcome is a _____event.
7. An event which has only one outcome is a _____event.
8. An event which has more than one outcome is a _____event.
9. The probability of a null event is _____.
10. The probability of a sure event is _____.
11. P(A) is the value between _____.
12. Complement of A is the event of _____of A.
13. If P(A) = 0.4, the value of P(A') is _____.
14. In throwing '2' dice, total number of possible outcomes is _____.
15. In tossing of '2' coins, total number of possible outcomes is _____.
16. If the probability of hitting the target is 0.7, the probability of missing the target is _____.
17. If a fair die is rolled once, the probability of getting an even number is _____.

Match the following. (Direct answers are given)

	The probability of null event		0
	The probability of sure event		1
	P(A) = 0.4		P(A') = 0.6
	P(AUA')		P(S)
	P(A)+P(A')		1
	P(A)		Value between 0 & 1
	P(AB) = P(A).P(B)		A & B are independent
	When a die is thrown the probability of obtaining even number is		$\frac{1}{2}$
	When a die is thrown the probability of obtaining odd number is		$\frac{1}{2}$

One Mark Questions:

1. Define an outcome.
2. What is a random experiment?
3. Define sample space.
4. Write the sample space when two coins are tossed once.
5. Write a sample space when a die is thrown once.
6. What is an event?
7. What is union of events?
8. What is intersection of events?
9. Give the classical (Mathematical) definition of probability.
10. Give the statistical (empirical) definition of probability.
11. Give an axiomatic definition of probability.
12. What is probability of null event?
13. What is the probability of sample space?
14. Define conditional probability.
15. If P(A) = ¼, what is $P(A^C)$?

Two mark questions:

1. What is a random experiment? Give an example.
2. Define null event. Give an example.
3. Define simple event. Give an example.
4. Define compound event. Give an example.
5. Define favourable outcomes with an example.
6. Define exhaustive outcomes with an example.
7. Define equally likely events with an example.
8. Define mutually exclusive events with an example.
9. What is complement of an event? Give an example.
10. Show that $0 \leq P(A) \leq 1$.
11. If A′ is the complementary event of A, then show that P(A) + P(A′) = 1.
12. Define independent events with an example.
13. Define dependent events with an example.
14. A coin is tossed once. Find the probability of getting a head.
15. A coin is tossed once. Find the probability of getting head or tail.
16. A die is thrown once. What is the probability of getting an odd number?
17. When two coins are tossed, find the probability of getting 2 heads.
18. A card is drawn from a pack of cards. What is the probability that it is a king or a queen card?
19. A card is drawn from a pack of cards .what is the probability that it is a red or black card?
20. If P(A) = 1/13, P(B) =1/4 and $P(A \cap B) = 1/52$ then, find the value of $P(A \cup B)$.
21. If P(A) =1/2, P(B) =1/3 and $P(A \cap B) = 1/6$ then , find $P(A \cup B)$.
22. If $P(A \cap B) = 1/3$ and P(B) = 2/3 then, find P(A|B).If P(A) = 2/3 and P(B|A) = 2/5 then, find $P(A \cap B)$.
23. If A and B are two independent events and P(A) = 0.6, P(B) = 0.5 then, find $P(A \cup B)$.

Five mark questions:

1. State and prove addition theorem of probability for any two events.
2. State and prove addition theorem of probability for two mutually exclusive events.
3. State and prove multiplication theorem of probability for two dependent events.
4. State and prove multiplication theorem of probability for two independent events.
5. A card is drawn randomly from a pack of 52 playing cards. Find the probability that it is: (i) a King or a Spade (ii) a Spade or a Red. (iii) a spade king.
6. A box contains cards numbered from 1 to 20. A card is drawn randomly from it. Find the probability of getting a card with: (i) an odd number (ii) a multiple of 4 (iii) a perfect square.
7. When three coins are tossed at a time. Find the probability of getting: (i) only heads (ii) at least two heads.
8. From a group of 6 boys and 4 girls, two are selected at randomly. What is the Probability that: (a) both are boys (b) both are girls (c) one is boy and other is a girl.
9. A box contains 5 red and 4 green balls. Two balls are drawn at random from this box. Find the probability that they are: (a) of different colours(b) of same colour.
10. A box contains 6 white, 4 black and 5 green balls. Three balls are drawn at random from this box. Find the probability that they are: (a) two white and one black (b) one white and two are green.
11. A box contains 5 red, 4 green and 3 blue marbles. Three marbles are drawn at random from this box. Find the probability that they are of: (i) different colours (ii) the same colour.
12. A bag contains 5 tickets numbered from 1 to 5. Two tickets are drawn at random. What is the probability that the sum of obtained numbers is:
    (i) odd (ii) even?
13. For a university cricket team 2 players are to be selected from a college having 5 batsmen,3 bowlers and 2 wicket-keepers. Find the probability of selecting-
    (i) a batsman and a wicket-keeper (ii) bowlers only.
14. A firm wants to select three candidates among 3 graduates, 5 undergraduates and 8 matriculates. What is the probability of selecting: (a) one graduate and two matriculates, (b) two undergraduates and one matriculate?

15. In a hostel 60% of students drink tea, 50% of students drink coffee and 20% of students drink both tea and coffee. Find the probability that a randomly selected student drinks either tea or coffee.

16. The probability that a contractor will get a plumbing contract is 1/2 and the probability that he will not get an electrical contract is 2/3. If the probability of getting at least one of these contracts is 2/3. What is the probability that he will get both?

17. Probability that A solves a problem is 2/3 and that B solves it is 3/5. If a randomly selected problem is given, find the Probability that: a) both of them solve, b) none of them solves.

18. A, B and C hit a target with probabilities 0.6, 0.5 and 0.4 respectively. If they hit at the target independently, find the probability that: (i) none of them hit the target (ii) the target is hit.

19. A box contains 40 nails and 20 screws. $1/4^{th}$ of nails and 20% of the screws are rusted. If one item is selected at random, what is the probability that it is a rusted nail or a screw?

20. A purse contains 4 silver and 2 gold coins. Another purse contains 3 silver and 4 gold coins. If a coin is selected at random from one of the two purses, what is the probability that it is a silver coin?

21. Contents of the bags are are as follows - I bag: 3 red and 2 green balls, II bag: 4 red and 3 green balls, III bag: 2 red and 2 green balls. One bag is selected at random and then a ball is drawn from it. Find the probability that it is red in colour.

22. Two fair dice are rolled. Find the probability that : (i) both the dice show same numbers, (ii) the sum of numbers is 7 or 11, (iii) the sum is divisible by 3 (iv) product of numbers obtained is 36.

23. What is the probability that there will be 53 Mondays in a randomly selectedi) Non-Leap year ii) Leap year?

24. A bag contains 3 white and 5 black marbles. Two marbles are drawn one after another.
    (i) What is the probability that both are white marbles under with replacement?
    (ii) Both are black marbles under without replacement.

UNIT – X

RANDOM VARIABLE

Choose the most appropriate answer from the choices given.

1. If 'X' is a random variable and 'a' is a constant then E(a) is equal to -
   a) a b) a E(X) c) aE(X) + b d) b

2. If 'X' is a random variable and 'a' is a constantthen E(aX) is equal to –
   a) a b) a E(X) c) aE(X) + b d) b

3. If 'X' is a random variable and 'a', 'b' are constants then E(aX+b) is equal to –
   a) a b) a E(X) c) aE(X) + b d) b

4. If 'X' is a random variable and 'a' is a constant then V(a) is equal to –
   a) a b) aV(X) c) $a^2V(X)$ d) 0

5. If 'X' is a random variable and 'a' is a constant then V(aX) is equal to –
   a) aV(X) b) $a^2V(X)$ c) $a^2V(X)$ + b d) a

6. If 'X' is a random variable and 'a', 'b' are constants then V(aX+b) is equal to –
   a) a V(X) b) a^2 V(X) c) $a^2V(X)$ + b d) a

7. If E(X) = 5, the value of E(8) is –
   a) 5 b) 0 c) 40 d) 8

8. If E(X) = 5, the value of E(-X) is –
   a) 5 b) -5 c) 0 d) 10

9. If E(X) = 5, the value of E(2X) is –
   a) 5 b) 2 c) 10 d) 20

10. If E(X) = 5, the value of E(2X+4) is –
    a) 5 b) 14 c) 10 d) 20

11. If V(X) = 5, the value of V(8) is –
    a) 5 b) 0 c) 40 d) 8

12. If V(X) = 5, the value of V(-X) is –
    a) 5 b) -5 c) 0 d) 6

13. If V(X) = 5, the value of V(2X) is –
    a) 5 b) 2 c) 10 d) 20

14. If V(X) = 5, the value of V(2X+4) is –
    a) 5 b) 14 c) 10 d) 20

15. If V(X) = 4, the value of $V\left(\frac{X}{2}\right)$ is –
    a) 0 b) 1 c) 2 d) 4

16. V(–X+2) is equal to
    a) –V(X) b) V(X) c) 0 d) V(X)+4

Fill in the blanks by choosing the appropriate word from those given in the brackets.

(Continuous, 0, 2, Discrete, 0, 4)

1. The value of E(2) is _____.
2. The value of V(2) is _____.
3. A random variable which takes the specified values in its range is called a _____random variable.
4. A random variable which assumes all the possible values in its range is called a _____random variable.
5. For two independent random variables X and Y, the value of Cov(X,Y) is _____.

Match the following. (Direct answers are given)

	$\Sigma p(x)$		Is equal to 1
	E(X)		$\Sigma x\ p(x)$
	S.D.(X)		$\sqrt{Var(X)}$
	E(a)		a
	E(aX)		a E(X)
	Var(a)		0
	Cov(X,Y)		E(XY) – E(X)E(Y)
	X and Y are independent		Cov(X,Y) = 0

One mark questions:

1. Define Random Variable.
2. Define Discrete Random Variable.
3. Define Continuous Random Variable.
4. What is meant by Probability Distribution?
5. Define Probability Mass Function.
6. Define Mathematical Expectation.
7. Express variance in terms of expectation.
8. Define a Joint Probability Mass Function.
9. What is the value of E(8) if 8 is a constant?
10. What is the value of V(4) if 4 is a constant?
11. What is the value of Cov(X, Y) if X and Y are independent?
12. Express covariance in terms of expectation.
13. What is the value of γfor two independent random variables?

Two mark questions:

1. If X is a random variable and a is a constant then prove that E(a)=a.
2. If X is a random variable and a is a constant then prove that E(aX) = a E(X).
3. If X ia random variable and b are any two constants, then prove that E(aX+b)=aE(X)+b.
4. If X is a random variable and a is a constant then prove that V(a) = 0.
5. If X is a random variable and a is a constant then prove that $V(aX) = a^2 V(X)$.
6. Write the formula for correlation coefficient in terms of expectation.

7. If E(X) = 5 and $E(X^2)$ = 36, find S.D.(X).
8. If $E(X^2)$ = 25 and Var (X) = 16, find E(X).
9. If E(X) = 10 and S.D(X) = 12, find E (X^2).
10. If E(X) = 5, what is E(6X)?
11. If E(X)= 8, what is E(4X+3)?
12. If E(X) = 2, what is E(-2X)?
13. If V(X) = 6, what is V(3X)?
14. If V(X) = 4, what is V(6X+7)?
15. If V(X) = 3, then find Var(-X).
16. If V(X) = 9, then find the values of Var(X/3).
17. If V(X) = 16, then find the values of Var(3 – X).

Five mark questions:

1. A person tosses a coin thrice. Find the expected number of heads.

2. A random variable X which assumes the values -1, 0 and 1 with respective probabilities 1/4,1/2 and 1/4. Find the mean and variance.

3. Find the value of k and then find the mean of the following distribution.

x	1	2	3	4	5	6
p(x)	0.1	0.15	k	0.25	0.18	0.12

4. A box contains 8 items of which 2 are defective. A man selects 3 items. Find the expected number of defective items in the selection.

5. Given the following probability distribution, find E(X).

x	-2	-1	1	2
p(x)	1/5	2/10	3/10	2/5

6. Calculate E(X+4) for the following probability distribution.

x	10	15	20
p(x)	1/6	2/6	3/6

7. Prove addition theorem of expectation for two discrete random variables X and Y.

8. Prove multiplication theorem of expectation for two independent random variables X and Y.

9. In a bi-variate data E(X)= 4, E(Y) = 10, $E(X^2)$= 25, $E(Y^2)$ = 136 and E(XY) = 20. Find Karl pearson's correlation.

10. In a bi-variate data E(X) = 6 E(Y) = 9, $E(X^2)$= 30 , $E(Y^2)$ = 120 and E(XY) = 20. find γ_{xy}. Conclude.

11. In a bi-variate data, E(X) = 0, E(Y) = 12, $E(X^2)$ = 49, $[E(X)]^2$ = 145 and E(XY) = 3.5. Find Cov(X, Y) and γ_{xy}.

12. For the following probability distribution, find E(X), Var(X) , S.D(X) and E(2X-4).

X	-1	0	1	2
p(X)	1/5	1/10	1/13	2/5

13. Find the mean and variance of the following distribution.

X	0	1	2	3	4
p(X)	3/8	1/4	1/8	3/16	1/16

14. From the following probability distribution, find the missing probability, mean and standard deviation of 'X'.

X	-2	-1	0	1	2
p(x)	0.2	0.3	0.2	?	0.1

15. Find the mean, variance and the value of 'k' of the following probability distribution.

X	-3	-2	0	2	3
p(X)	k/6	k/12	2k/3	k/2	k/6

16. A random variable 'X' assumes the values 10 and 20 with respective probabilities 1/3 and 2/3 Find its mean and variance.

17. A random variable 'X' assumes the values 5 and 10 with probabilities 0.6 and 0.4 respectively. Find E(X), E(2X), V(X).

18. A bag has 4 white and 6 red balls. Two balls are randomly drawn from the bag, find the expected number of white balls.

19. A bag contains 4 green and 3 red balls. A man draws 3 balls at random from the bag. If he is to receive Rs.200 for every green ball he draws and Rs.50 for every red one. What is his expectation?

20. A person throws a biased coin. He gets Rs.80 if head appears otherwise he gets Rs.20. If the probability of occurrence of head is 1/3, find his expected amount.

21. A man throws a fair die. If the throw results in an even number, he gets Rs500 otherwise he loses Rs.100, find his expectation.

22. A man throws a fair die once. If the number obtained is divisible by 3 he gets Rs.900,otherwise he loses Rs250, find his expectation.

23. A person, by paying Rs.50 enters into a game of shooting a target. With one shot, if he hits the target, he gets Rs 1000, otherwise he gets nothing If his probability of hitting the target is 1/7. Find his expected amount.

24. In a lottery, there are 1000 tickets costing Re.1 each. There is one first prize worth Rs.100, two second prizes worth Rs.20 each and ten third prizes worth Rs.10 each. Find the expected loss in buying one ticket.

25. A bag has 3 one-rupee, 4 two rupees and 2 five rupees coins. A boy picks two coins at random from the bag. What is the expectation of the amount of the coins?

26. A bag contains 6 tickets numbered 1 to 6. A person draws two tickets at random. If the sum of the numbers on the tickets drawn is even, he gets Rs.100, otherwise he loses Rs.50. What is his expectation?

27. Two fair coins are tossed once. A person receives Rs.10 if both head appears and Rs.5 if both tail appears, otherwise he loses Rs. 8, find the expectation of a person.
28. The probability of a person hitting a target is 2/3. If he hits the target he gets Rs.150, otherwise he loses Rs. 50. Find his expectation.

29. From the following joint probability distribution of X and Y. Find the value of k, E(X+Y) and γ_{xy}

X \ Y	1	3	9
2	0.1	0.1	0.05
4	0.2	K	0.1
6	0.1	0.15	0.2

30. For the following joint probability distribution of X and Y, find γ and E(3X+4Y) .

X / Y	1	2	3
-5	0	0.1	0.1
0	0.1	0.2	0.2
5	0.2	0.1	0

31. From the following bivariate data of X and Y find (i) 'k' (ii) E(2X+3Y)

x\ y	0	10	20
1	0	0.1	0.1
2	0.1	0.2	0.1
3	0.2	k	0.1

32. From the following bi-variate data of X and Y find co-efficient of correlation between X and Y

x\ y	0	10	20
1	0	0.1	0.1
2	0.1	0.2	0.1
3	0.2	0.1	0.1

33. For the following data find γ_{xy}

x\ y	1	2	3
5	0	0.1	0.1
0	0.1	0.1	0.2
1	0.1	0.2	0.1