JEMAS(PG)-2024 **QB No: 4103000001**

Subject: M. Phil in Regenerative Medicine & Translational Sciences (M. Phil RMTS)

Duration: 90 minutes **No of MCQ: 100** **Full Marks: 100**

INSTRUCTIONS

1. All questions are of objective type having four answer options for each.
2. **Category-1**: Carries **1** mark each and only one option is correct. In case of incorrect answer or any combination of more than one answer, ¼ mark will be deducted.
3. Questions must be answered on OMR sheet by darkening the appropriate bubble marked A, B, C, or D.
4. Use only **Black/Blue ink ball point pen** to mark the answer by filling up of the respective bubbles completely.
5. Write Question Booklet number and your roll number carefully in the specified locations of the **OMR** sheet. Also fill appropriate bubbles.
6. Write your name (in block letter), name of the examination center and put your signature (as is appeared in Admit Card) in appropriate boxes in the **OMR sheet**.
7. The OMR sheet is liable to become invalid if there is any mistake in filling the correct bubbles for Question Booklet number/roll number or if there is any discrepancy in the name/ signature of the candidate, name of the examination center. The OMR sheet may also become invalid due to folding or putting stray marks on it or any damage to it. The consequence of such invalidation due to incorrect marking or careless handling by the candidate will be sole responsibility of candidate.
8. Candidates are not allowed to carry any written or printed material, calculator, pen, log-table, wristwatch, any communication device like mobile phones, bluetooth devices etc. inside the examination hall. Any candidate found with such prohibited items will be **reported against** and his/her candidature will be summarily cancelled.
9. Rough work must be done on the Question Booklet itself. Additional blank pages are given in the Question Booklet for rough work.
10. Hand over the OMR sheet to the invigilator before leaving the Examination Hall.
11. Candidates are allowed to take the Question Booklet after examination is over.

Signature of the Candidate: _____

(As in Admit Card)

Signature of the Invigilator: _____

ROUGH WORK ONLY

M.Phil. RMTS

1. What is Pharmacokinetics?
   (A) It is defined as to what the body does to a drug.
   (B) It is defined as to what the drug does to a body.
   (C) It is related to adverse drug interaction.
   (D) It is related to the efficacy of the drug.

2. Northern blotting is used to detect?
   (A) DNA.
   (B) Protein.
   (C) RNA.
   (D) Virus.

3. What is quantitative PCR used for?
   (A) To measure the number of copies of transgenic DNA and its qualification.
   (B) To measure the number of copies of RNA.
   (C) To measure the number copies of transgenic RNA.
   (D) Used to measure the frequency of the number of copies of RNA and DNA.

4. Human cord blood is a predominant source for which type of stem cells?
   (A) Very small embryonic like stem cells.
   (B) Hematopoietic stem cells.
   (C) Mesenchymal stem cells.
   (D) Endothelial progenitor cells.

5. What is the potency of very small embryonic like stem cells?
   (A) Unipotent.
   (B) Multipotent.
   (C) Pluripotent.
   (D) Totipotent.

6. Animal handling and animal research is strictly monitored by an organisation apart from local institutional ethics body. The name of the organization is:
   (A) NAC-SCRT.
   (B) IC-SCRT.
   (C) IAEC.
   (D) CPCSEA.

7. What is the difference between blast and colony forming unit cells?
   (A) Blast consist of more primitive cells and can grow for a longer generation whereas colony forming unit consists of less primitive or more progenitor.
   (B) Both blast and colony forming units are the same as they both contain primitive hematopoietic stem cells that can grow.
   (C) Blast consists of more progenitor cells and can grow for a longer generation whereas colony forming unit consists.
   (D) Blast are the primitive hematopoietic stem cells for mouse and colony forming unit cells are the primitive.

8. Whartons jelly is a rich source for?
   (A) Very small embryonic like stem cells.
   (B) Induced pluripotent stem cells.
   (C) Mesenchymal stem cells.
   (D) Endothelial progenitor cells.

9. Alkaline phosphatase is used as a marker for which type of stem cells?
   (A) It is an enzymes that is highly up regulated in pluripotent stem cells only and therefore a pluripotent marker.
   (B) It is an enzyme that is highly up regulated in fetal stem cells only and is therefore a marker of fetal stem cells.
   (C) It is an enzyme that is highly up regulated is mesenchymal stem cells only and therefore a bio marker for mesenchymal stem cells.
   (D) It is an enzyme that ils highly up regulated in hematopoietic stem cells only and therefore a marker for hematopoietic stem cells.

10. What is opsonization?
   (A) Process by which viruses get coated with special antibodies called opsonins so as to make them more attractive to phagocyte cells.
   (B) Process by which bacteria get coated with special antibodies called opsonins so as to make them more attractive to phagocyte cells.
   (C) Process by which protozoans get coated with special antibodies called opsonins so as to make them more attractive to phagocyte cells.
   (D) Process by which fungi get coated with special opsonins so as to make them more attractive to phagocyte cells.

11. What is the role of matrix metalioproteinases in cancer metasis?
   (A) Helps in the promotions of fibroblasts.
   (B) Helps in the promotion of mesenchymal stem cells.
   (C) Helps in the activation of apoptopic pathways.
   (D) Helps In the degradation of both matrix and non-matrix proteins.

12. Role of fibroblast in tissue regeneration and healing?
   (A) Helps in synthesis of progenitor cells specific to the tissue or organ.
   (B) Helps in synthesis of tissue specific stem cells.
   (C) Helps in migration of stem cells to the site of injury and formation of stroma.
   (D) Helps in synthesis of extra cellular matrix, stroma and more importantly collagen.

13. Hypoxia inducible factor 1 helps stem cells in what way?
   (A) Undifferentiated and remain pluripotent in hypoxic conditions.
   (B) Spontaneously differentiate under hypoxic conditions.
   (C) Results in malignant transformation of pluripotent stem cells.
   (D) Upregulated the caspase pathway in stem cells and therefore results in programmed cell death of stem cells.

14. In Huntington Chorea disease the molecular pathology for the cause of chorea is?
   (A) It is caused by a dominantly inherited CAG repeat expansion in exon 1 of the huntingtin gene (HTT).
   (B) It is caused by a repeated expansion in exon 1 of the huntingtin gene (HTT) only.
   (C) Is caused by a dominantly inherited GAG repeat expansion in exon 1 if the huntingtin.
   (D) Is caused by a dominantly inherited GAAA repeat expansion in exon 1 of the huntingtin gene (HTT).

15. What type of lipid makes the bi lipid layer of a cell?
    (A) Hydrophobic.
    (B) Hydrophilic.
    (C) Amphiphilic.
    (D) Zwitter ion.

16. Mark correct nuclear transcriptional marker for embryonic stem cells.
    (A) TRA 1-60.
    (B) TRA 1-80.
    (C) SOX2.
    (D) SSEA-4.

17. What is blood transfusion?
    (A) Transfer of nucleated cells from one system to another.
    (B) Transfer of non-nucleated cells form one system to another.
    (C) Transfer of mononuclear cells from one system to another.
    (D) Transfer of total nucleated cells form one system to another.

18. What best a syngeneic transplant is defined?
    (A) Transplantation between two twins having non-identical genotype.
    (B) Transplantation between two individuals having identical genotype.
    (C) Transplantation between two individuals having no identical genotype.
    (D) Transplantation between two twins having identical genotype.

19. Which is the best answer that fits the TH1 immune profile?
    (A) Humoral mediated.
    (B) Cell mediated.
    (C) Immunosuppression and homeostasis.
    (D) Cytotoxic T lymphocyte mediated.

20. Multiple myeloma is a cancerous disease of?
    (A) When excessive white cells are produced.
    (B) When excessive plasma cells are produced.
    (C) When excessive platelets are produced.
    (D) When excessive lymphocytes are produced.

21. What is auto transplantation of islet beta cells in diabetes type 1 patient?
    (A) Cells from porcine are transplanted with immunosuppression.
    (B) Cells from a donor are transplanted with immunosuppression.
    (C) Cells from the patient itself is transplanted with immunosuppression.
    (D) Cells from the patient is transplanted without any immunosuppression.

22. What type of antibiotic is gentamicin?
    (A) Cephalosporin.
    (B) Penicillin.
    (C) Tetracycline.
    (D) Aminoglycosides.

23. What is dizygotic twin?
    (A) Formed from two egg fertilized by two different spermatozoa.
    (B) Formed from two eggs fertilized by a single spermatozoa.
    (C) Formed from one egg fertilized by a single sperm.
    (D) Formed from one egg fertilized by the same spermatozoa.

24. What is the importance of French Flag in stem cell medicine?
    (A) It shows the effect of morphogens on stem cell differentiation, with white meaning not enough morphogen, red meaning negative concentration of the morphogens and blue meaning enough morphogen concentration to activate stem cell differentiation.
    (B) It shows the rate at which a stem cell proliferate or undergoes self-renewal, red means no proliferation, white means sub-par or not optimal proliferation and blue means above par or optimal proliferation of stem cells.
    (C) It relates to the upregulation and downregulation of cancer genes in cancer genes in cancer stem cells, with white showing no regulation of the genes in cancer stem cells and blue showing upregulation of the genes in the cancer stem cells.
    (D) It is a method used to see the potency of stem cells in vitro. Pluripotent stem cells re labelled as blue, multipotent stem cells are labelled as white and unipotent stem cells are labelled as red.

25. Why equal volume of media is added to equal volume of trypsin after incubation of stem cells for 5 minutes with trypsin during the passaging of stem cells?
    (A) It is added just to make up a total volume having equal concentration of trypsin and media to help in the next step of centrifugation.
    (B) Equal volume of trypsin and media is added to negate the harmful effect of trypsin on the stem cells that were kept for 5 minutes of incubation along with the trypsin.
    (C) Equal volume of trypsin and Media will help in precipitation of the stem cells present in the solution.
    (D) The equal volume of media is added to trypsin as trypsin doesn't contains any essential substances that are required for the stem cells to grow in the next step which is another round of incubation for 24 hours.

26. Side scatter in Flowcytometry is used for analysing which property of stem cells?
    (A) To determine the size of the stem cells.
    (B) To determine the complexity and granularity of the stem cells.
    (C) To determine a specific cell surface marker of a stem cell in question.
    (D) Side scatter specifically determines the number of viable and dead stem cells in the sample population of stem cells.

27. What is the role of p53 in cancer?
    (A) Is a major hallmark in cancer especially in cancer cell progression as it facilitates the cancer cells to metastasize and is highly upregulated in cancer cells.
    (B) Plays a major role in suppressing tumors by regulating DNA repair and cell division.
    (C) Do not have a role in cancer.
    (D) Destroys cancer cells by secreting perforins and granzymes.

28. What is the role of decidual NK cells during pregnancy?
    (A) These are CD56+, dim, CD16+ and therefore less hostile than peripheral NK cells and helps in placentation process by remodelling the ECM, angiogenesis, secreting growth factors and trophoblast invasion.
    (B) These are CD56+ bright, CD16+ and therefore less hostile than peripheral NK cells and helps in placentation process by remodelling the ECM, angiogenesis, secreting growth factor and trophoblast invasion.
    (C) These are CD56+, CD16+ and helps in placentation process by remodelling the ECM, angiogenesis, secreting growth factors and trophoblast invasion.
    (D) These are CD56+ dim,CD16+ and helps in safeguarding the uterine environment by stopping the entry of stopping the entry of any foreign pathogens.

29. Why phenol red is added to DMEM before stem cell culture?
    (A) It is a PH indicator and any change in colour of the media from pink red will indicate whether the media has become alkaline or acidic.
    (B) It is used a substitute to serum in media.
    (C) It is added to supplement the cells with nutrition and essential amino acids.
    (D) Phenol red can be used a substitute for antibiotics and anti fungals in stem cell culture media.

30. Which of the following statement explain chimeria the best?
    (A) Contains a single set of DNA that is different from the host.
    (B) Contains two different types of DNA or cells in a single organism that can produce more than one distinct genotype in the organism with subtle changes in the phenotypic expressions also.
    (C) Contains two different types of DNA or cells in a single organism and produces only one genotype and no changes in the phenotype.
    (D) Contains more than two different types of DNA but the genotype and the phenotype remains the same.

31. What is reproductive cloning?
    (A) It is a part of Somatic cell Nuclear Technology where the enucleated egg cell and the somatic cell nucleus are fused together and then injected into a surrogate mother.
    (B) It is a part of somatic cell Nuclear Technology where the enucleated somatic cell and nucleus from an egg are fused together and then injected into a surrogate mother.
    (C) It is a part of Somatic Cell Nuclear Technology where the enucleated egg cell and somatic cell nucleus are fused together and the culture under invitro conditions to develop into an embryo.
    (D) It is a part of Somatic Cell Nuclear Technology where the enucleated Somatic cell and the nucleus from an egg are fused together and the culture under in vitro condition to develop into an embryo.

32. To identify Mesenchymal stem cells apart from CD marker analysis what other methods would you perform in lab to identify these cells?
    (A) Assess their ability to differentiate into osteocytes by osteogenic differentiate media and using alizarin red stain.
    (B) Assess their ability to differentiate into chondrocytes by using chondrogenic differentiation media using alcian blue stain.
    (C) Assess their ability to differentiate into neurons by using neurogenic differentiation media and Old Red O stain.
    (D) Assess their ability to differentiate into adipocytes, osteocytes and chrondrocytes using specific stains.

33. To identify pluripotent stem cells, apart from CD and transcriptional marker analysis and teretoma assay, name another method for identifying human pluripotent stem cells:
    (A) Western Blotting.
    (B) Alkaline phosphatase test.
    (C) SDS PAGE.
    (D) Southern blotting.

34. Mark the best answer for the disease erythroblastosis fetails?
    (A) Haemolytic anemia of the fetus or newborn caused due to material immune system and blood group incompatibility.
    (B) Hemolytic anemia of fetus or neonate caused due to compromise in the placental barrier.
    (C) Haemolytic anemia of fetus or neonate caused due to low haemoglobin of the mother.
    (D) Hemolytic anemia of the fetus or neonate caused due to the failure to form a functional hematopoietic system during process of fetal development.

35. What are the challenges of artificially reconstructed teeth?
    (A) Production of dentin.
    (B) Production of enamel.
    (C) Production of pulp.
    (D) Production of both enamel and dentin.

36. What is the primary haemoglobin that is present only during the embryonic life:
    (A) Gower II.
    (B) Gower I.
    (C) Portland I.
    (D) Portland II.

37. Cord blood is predominantly which type of cells?
    (A) Mesenchymal stem cells.
    (B) Hematopoietic stem cells.
    (C) Induced pluripotent stem cells.
    (D) Embryonic stem cells.

38. How cancer stem cells are different from cancer cells?
    (A) Cancer stem cells are less aggressive than cancer cells and are easy to treat.
    (B) Cancer stem cells rare and more aggressive than cancer cells and are very difficult to treat.
    (C) Cancer stem cells can be detected early than cancer cells.
    (D) Cancer stem cells are mainly derived from stem cells mutation and cancer cells from somatic cells mutatuions.

39. What are the core pluripotent networks?
    (A) Oct-4, SOX-2, NANOG.
    (B) Lin-28, SOX-2, NANOG.
    (C) Klf, C- thyc, Oct-4.
    (D) NANOG, SOX-2, c-Myc.

40. From where mesenchymal stem cells can be collected?
    (A) The sub ventricular and sub gyral zone of the brain.
    (B) From the crypts of Liberkuhn in the gut.
    (C) Cord blood.
    (D) From the epidermal layer of the skin.

41. Label the correct oligodendrocyte marker:
    (A) NeunN.
    (B) SOX10.
    (C) Pdx1.
    (D) SSEA-1.

42. What does the forward scatter detect in a flow cytometry of stem cells?
    (A) Size of the stem cells.
    (B) The complexity or granularity of a stem cell.
    (C) Both the complexity or granularity and size of the stem cell.
    (D) Helps in identification of the number of viable stem cells present.

43. What are the three different class of Bio Safety Cabinet for animal and human cell culture?
    (A) Class I, Class IIA, Class III.
    (B) Class I, Class IIA, Class IIB.
    (C) Class I, Class II, Class III.
    (D) Class I, Class IA, Class IIA.

44. What does cell mediated immunity involves?
    (A) Involves plasma cells and anitbodies.
    (B) Involves granulocytes predominantly.
    (C) Involves NK cells, macrophages, CD4 T helper and CD8 cytotoxic T.
    (D) Involves B cells.

45. The adipose tissue from Sub cutaneous fat is rich in which type of stem cells?
    (A) Hematopoietic stem cells.
    (B) Embryonic stem cells.
    (C) Mesenchymal stem cells.
    (D) Induced pluripotent stem cells.

46. What are Reed-Sternberg cells?
    (A) These are large abnormal lymphocytes that may contains more than one nucleus and is found in Hodgkins Lymphoma.
    (B) These are large, abnormal lymphocytes that may contain more than one nucleus and is found in Non Hodgkins Lymphoma.
    (C) These are large abnormal lymphocytes that may contains more than one nucleus and is found in Multiple myeloma.
    (D) These are large abnormal leukocytes that may contain more than one nucleus and is found in Multiple myeloma.

47. Which type of tissue is blood?
    (A) Connective tissue.
    (B) Hematopoietic tissue.
    (C) Adipose tissue.
    (D) Endothelial tissue.

48. What does Collagen II synthesize?
    (A) Main component of the organic part of bone.
    (B) Main collagenous component of cartilage.
    (C) Main component of reticular fibers.
    (D) Adipocytes will be synthesized.

49. What is hypoxemia?
    (A) Low oxygen in your tissues.
    (B) Low partial pressure oxygen in your blood.
    (C) Low oxygen in your organ.
    (D) Low oxygen in your cells.

50. Embryonic stem cells are separated from the inner cell mass of the blastocyst embryo. The most common technique that is applied to derive these human embryonic stem cells?
    (A) Single cell balstomere technology.
    (B) Immunosurgery.
    (C) Mechanical dissolution method.
    (D) Enzyme dissolution method.

51. Caspases are which class of enzymes?
    (A) Hydrolytic enzymes.
    (B) Proteolytic enzymes.
    (C) Amylase enzyme.
    (D) Lipase enzyme.

52. Very small embryonic stem cells are also found in?
    (A) Cord blood.
    (B) Sub ventricular zone.
    (C) Bone marrow.
    (D) Adipose tissue.

53. What is trans differentiation of stem cells?
    (A) Conversion of stem cells from one cell/tissue lineage to another.
    (B) Conversion of stem cells from an immature to a matured state.
    (C) Differentiation od stem cells into transit amplifying cells.
    (D) The inability of stem cells to differentiate into adult cells of the.

54. What is photobleaching in fluorescence microscopy?
    (A) The phenomenon when a flurophene loses its fluorescence due to damage induced by light.
    (B) The phenomenon when a flurophore loses its fluorescence due to its cellular damage.
    (C) The phenomenon when a flurophore loses its fluorescence due to its non-specific binding.
    (D) The phenomenon when fluorphore is not viewed in the correct band pass filters.

55. Why ethanol is used in DNA and RNA isolation?
    (A) Nucleic acids are soluble in ethanol and therefore they will precipitate as pellets.
    (B) Nucleic acids are insoluble in ethanol and therefore they precipitate as pallets.
    (C) Nucleic acids easily dissolve in ethanol and separate out as small strands.
    (D) Nucleic acid do not dissolve in ethanol and therefore they will separate out as small strands immediately.

56. Pathogenesis of Multiple Scierosis can be best related to:
    (A) A non-inflammatory demyelinating disease of the CNS in which activated immune cells invade the central nervous system and cause neurodegeneration and tissue damage specially to the myelin sheaths.
    (B) A non-inflammatory demyelinating disease of the CNS in which activated immune cells invade the central nervous system and cause inflammation, neurodegeneration and tissue damage specially to the myelin sheath.
    (C) A non-inflammatory demyelinating disease of the CNS in which due to viral infection, there is inflammation neuro degeneration and tissue damage specially to the myelin sheath.
    (D) A non-inflammatory demyelinating disease of the CNS in which activated immune cells invade the central nervous system and cause inflammation neuro degeneration and tissue damage by destroying the dopaminergic neurones.

57. Choose the correct answer which best defines the process of neurulation:
    (A) The process of formation of the spinal cord.
    (B) The process of transforming the flat neural plate into a neural "tube".
    (C) The process of transforming the flat neural plate into the neruoepithelial tissues segment.
    (D) The process of transforming the ectoderm into a notochord.

58. Mark the correct retrovirus that is normally used to reprogram somatic cells into induced pleuri potent stem cells.
    (A) Piggy Bac.
    (B) Lenti virus.
    (C) Plasmid.
    (D) Adenovirus.

59. What is the role of Tfh or T follicular helper cells?
    (A) These are found in secondary organs like tonsils and plays an important role in germinal center formation, maturation, and the development of most high affinity antibodies and memory B cells.
    (B) These plays and important role in cell mediated toxicity.
    (C) These play an important role in humoral mediated immunity.
    (D) These play an important role in immune suppression and homeostasis.

60. Which are the most abundant NK cells that are circulating in an adult peripheral blood?
    (A) CD56 dim & CD 16 bright which represents 90% of all peripheral blood cells.
    (B) CD56 negative & CD16 bright positive which represents 90% of all peripheral.
    (C) CD56 & CD16 negative which represents 90% of all peripheral blood cells.
    (D) Only CD25 bright cells represents 90% of all peripheral blood cells.

61. What are the CD markers of Mesenchymal stem cells by which you can identify them from a group of other cells?
    (A) CD 105, 106, 29.
    (B) CD 34, 38, 166.
    (C) CD45, STRO-1, CD105.
    (D) CD105, 106 & SSEA-1.

62. Apart from hematopoietic stem cells, what is the other predominant type of stem cell the bone marrow contains?
    (A) Very small embryonic like stem cells.
    (B) Induced pluripotent stem cells.
    (C) Mesenchymal stem cells.
    (D) Embryonic stem cells.

63. BRCA 1 & 2 mutation are often susceptible to breast Cancer. What are these two genes?
    (A) BRCA 1 & 2 are oncogenes.
    (B) BRCA 1 & 2 are tumour suppressor genes.
    (C) BRCA 1 & 2 are genes for breast Cancer stem cells.
    (D) Deletion of BRCA 1 & 2 causes Cancer.

64. Somatic cell Nuclear Technology is an important technology that is being used in stem cell medicine. Which is the best answer for therapeutic cloning?
    (A) In therapeutic cloning the embryonic stem cells are isolated from the inner cells mass of a donated embryo and cultured in vitro for further therapeutic use.
    (B) In therapeutic cloning the enucleated egg is fused with the somatic cell nucleus and then transplanted in a surrogate mother for further development into blastocyst stage for further therapeutic use.
    (C) In therapeutic cloning the enucleated egg is fused with the somatic cell nucleus and then cultured under in vitro conditions till the formation of the inner cell masses of the blastocyst stage from where embryonic stem cells can be collected for further therapeutic use.
    (D) In therapeutic cloning the enucleated somatic cell is fused with the nucleus of the egg and then cultured under in vitro conditions till the formation of the inner cell mass of the blastocyst stage from where embryonic stem cells can be collected and transplanted in a surrogate mother for further development into blastocyst stage for further therapeutic use.

65. Label the correct type of blood cell that arises from the myeloid progenitor cells?
    (A) Platelets and lymphocytes.
    (B) Leukocytes and lymphocytes.
    (C) Platelets and granulocytes.
    (D) Platelets and leukocytes.

66. Who was awarded the Nobel Prize in 1993 in Chemistry for inventing PCR?
    (A) Kary Mullins.
    (B) Barbara Mc Clintock.
    (C) Alec Jeffrey.
    (D) Eva Engvail and Peter Pertmen.

67. To identify specific protein from a group of protein which technique you would use?
    (A) Southern Blotting.
    (B) SDS PAGE.
    (C) Western Blotting.
    (D) Northern Blotting.
68. What are monoclonal antibodies?
    (A) These are identical immunoglobulins, generated from a single B-cell clone.
    (B) These are different immunoglobulins generated from a multiple B-cell.
    (C) These are non identical immunoglobulins generated.
    (D) These are identical immunoglobulins generated from a single T-cell clone.

69. In stem cell biology, the word “blast” is often used. What does blast refer to?
    (A) Blast refers to a group of matured, differentiated cells.
    (B) Blast refer to a group of precursor immature undifferentiated cells.
    (C) Blast refer to a group of uncontrolled cell division resulting in tumor formation.
    (D) Blast refer to a group of cells that have resulted in necrosis due to excessive proliferation.

70. What does fibroblasts secrete during the time of wound healing at the site of injury? Mark the best answer:
    (A) Growth factors.
    (B) Cytokines.
    (C) Chemokines.
    (D) Collagen.
71. What are keranitocytes present?
    (A) Dermis.
    (B) Hypodermis.
    (C) Epidermis.
    (D) Basement membrane.

72. What type of stem cells does the amnion of the amniotic membrane contains?
    (A) Mesenchymal stem cells.
    (B) Hematopoietic stem cells.
    (C) Adipose derived stem cells.
    (D) Endothelial progenitor cells.

73. Karyotyping is a technique by which one can identify the set of chromosomes structure or number. One of them is Klinfelters syndrome represented by chromosomes numbers?
    (A) 47, XYY.
    (B) 47, XXY.
    (C) 46, XY.
    (D) 46, XX.

74. Which of the following are not glial cells of the brain?
    (A) Neuron.
    (B) Astrocytes.
    (C) Microglia.
    (D) Oligodendrocytes.

75. Repeated exposures of the teeth to gastric contents results in?
    (A) Abrasion.
    (B) Caries.
    (C) Attrition.
    (D) Erosion.

76. Gamma Amino Butyric Acid or commonly called as GABA is a:
    (A) Neuroinhibitpr.
    (B) Neurotransmitter.
    (C) Contact inhibitor.
    (D) Contact exciter.

77. How would you characterized and check the potency of hematopoietic stem cells in vitro?
(A) By the ability of forming various types of colony forming units of CFU.
(B) By the ability of differentiate into ectoderm, endoderm and mesoderm.
(C) By the ability to differentiate into adipocytes, osteocytes and chondrocytes.
(D) By the ability to form teratoms.

78. How would you like to identify stem cells developing into neunoral cells from a group of cells present in the tissue cultures?
(A) By looking for specific neunoral markers like nestin, NeuN using flow cytometry and immunofluorescence.
(B) By looking for specific neunoral makrers like SSEA-1 and GFAP.
(C) By looking for specific neunoral markers like SSEA-3 and KI67.
(D) By looking for specific neunoral markers like SSEA-4 and NeunN.

79. The adipose tissue from sub cutaneous fat is rich in which type of stem cells?
(A) Hematopoietic stem cells.
(B) Embryonic stem cells.
(C) Mesenchymal stem cells.
(D) Induced pluripotent stem cells.

80. How stem cell homeostasis is maintained?
(A) By producing two stem cells or symmetric division that helps in maintaining the tissue resident stem cell pool.
(B) By producing two progenitor cells or symmetric division that differentiates into a tissue or organ specific adult cell thereby maintaining the homeostasis of the tissue.
(C) By undergoing asymmetric division and thereby producing one stem cell and the other progenitor cell which further differentiates into an adult cell or a tissue specific cells.
(D) By undergoing asymmetric division whereby one cell undergoes apoptosis and the other develops into a stem cell which later on differentiates into an adult cell of a specific tissue or organ.

81. What can be alternative substitute of DMSO in cryopreservation of stem cells?
(A) Knockout Serum.
(B) Glycerol.
(C) Beta Mercaptoethanol.
(D) Methanol.

82. Mark the correct start codon required for initiating translation on m RNA:
(A) UAA.
(B) UAG.
(C) UAC.
(D) AUG.

83. What is hemoptysis?
(A) Expectoration of blood, alone or mixed with mucus, from the lower respiratory tract.
(B) Expectoration of blood, alone or mixed with mucus, from the upper respiratory tract.
(C) Blood in the urine.
(D) Blood in stool.

84. Clinical trials in stem cells for licensing purposes needs a clearance from which organization in India:
(A) CDSCO.
(B) DCGI.
(C) ICMR.
(D) Clinical Research Ethics Committee.

85. Where B cells produced in the body?
(A) Thymus liver.
(B) Liver.
(C) Bone marrow.
(D) Lymph nodes.

86. What is explant culture?
(A) The culture of small pieces of tissue surgically removed from animal tissue or organ.
(B) The process by which individual cells are surgically removed from animal tissue or organ.
(C) The process by which one or more cells are surgically removed from animal tissue or organ.
(D) Co culture of two types of cells is also known as explant culture.

87. Why in tissue engineering decellularized organs or membranes are used?
(A) Decellularized organs or membranes act as scaffolds with extracellular matrix where cells can be seeded.
(B) Decelluralized organs or membranes are used in cell culture expansion protocols.
(C) Decelluralized organs or membranes have cells that can helps in regeneration of a tissue.
(D) Decellularized organs or membrane can be used as explant culture.

88. What is forward scatter in FACS used for characterization of different type of stem cells?
(A) It is used to identify different types of stem cells based on their granularity and content.
(B) It is used to identify different types of stem cells based on their sizes.
(C) It is used to identify the number of dead and viable cells present in a stem cells sample population.
(D) It is used to identify the amount of DNA content of the stem calls based on which the stem cells characterized.

89. C- reactive protein an important marker for inflammation is produced in which organ:
(A) It is produced in the kidney.
(B) It is produced in the liver.
(C) It is produced in the thymus.
(D) It is produced In the lungs.

90. Which is the best example of Mesenchymal stem cells?
(A) Mesenchymal stem cells are multipotent stem cells and are characterized by CD markers CD34, CD45 and CD 11b.
(B) Mesenchymal stem cells are pluripotent stem cells and are characterized by CD markers CD38, CD44 and CD 11b.
(C) Mesenchymal stem cells are multipotent stem cells and are characterized by CD markers CD29,CD90 and CD 73.
(D) Mesenchymal stem cells are mesenchymal stem cells and are characterized by CD markers CD25, CD56 and CD11b.

91. Elizabeth Kübler-Ross is known for her research in the area of:
    (A) TRITC
    (B) FITC.
    (C) F-ACTIN.
    (D) DAPI.

92. What are organoids in stem cell medicine?
    (A) Organoids are small, self organized 3d cultures made from pluripotent stem cells and that represents most of the tissue complexity and structural organization of a specific organ.
    (B) Organoids are small, self organized 3d cultures made from hematopoietic stem cells and that represents most of the tissue complexity and structural organization of a specific organ.
    (C) Organoids are small, self organized 3d cultures made from mesenchymal stem cells and that represents most of the tissue complexity and structural organization of a specific organ.
    (D) Organoids are small, self organized 3d cultures made from tissue specific stem cells and that represents most of the tissue complexity and structural organization of a specific organ.

93. What is haematopoiesis?
    (A) Formation of red blood cells.
    (B) Formation of the lymphoid system only.
    (C) Formation of whole blood cells and red blood cells.
    (D) Formation of the lymphoid and myeloid system.

94. Thrombopoiesis is also defined as?
    (A) Formation of reticuloendothelial.
    (B) Formation of erythrocytes.
    (C) Formation of bone marrow cells.
    (D) Formation of platelets.

95. Which organelles is regarded as the powerhouse of the cell?
    (A) Mitochondria.
    (B) Ribosomes.
    (C) Edoplasmic reticulum.
    (D) Golgi apparatus.

96. Mark the correct stem cell marker for pluripotent stem cells:
    (A) Sca-1.
    (B) Stro-1.
    (C) Vimentin.
    (D) Oct-3/4.

97. What is granulation tissue in a wound?
    (A) A type of new connective tissue, and microscopic blood vessels and have three main functions like providing immunity to the area from further wound, proliferation of new cells and replaces necrotic tissues.
    (B) A type of new connective tissue, and microscopic blood vessels and have functions like inducing apoptosis to cells , providing immunity to the area from further wound, and angiogenesis.
    (C) A type of new connective tissue, and microscopic blood vessels and have functions like inducing necrosis providing immunity to the area from further wound, and angiogenesis.
    (D) A type of new connective tissue, and microscopic blood vessels and have three main functions like providing immunity to the area from further wound, proliferation of new cells and angiogenesis and replaces necrotic tissue.

98. In pregnancy test kits, which hormone is present to detect a positive pregnancy:
    (A) Human chronic gonadotrophic hormone.
    (B) Estrogen.
    (C) Progesterone.
    (D) Follicle stimulating hormone.

99. hCG (Human Chronic Gonadotrophin) hormone is secreted by which type of cells?
    (A) hCG , is produced specifically by the vilious syncytiotrophoblast cells as pregnancy progresses.
    (B) hCG is produced specifically by the hypoblast cells as pregnancy progress.
    (C) hCG, is produced specifically by the epiblast cells are pregnancy progresses.
    (D) hCG, is produced specifically by the primordial germ cells as pregnancy progresses.

100. Which hormone is thought to be primarily responsible for causing osteoporosis on women?
    (A) Progesterone.
    (B) Estradiol.
    (C) Estrogen.
    (D) Follicle stimulating hormone.