JEMAS(PG)-2024 **QB No: 4101600001**

Subject: Fellowship in Regenerative Medicine & Translational Sciences. (FRMTS)

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

FRMTS

1. What is the function of Aspartate aminotransferase in the liver?
   (A) AST is a transaminase enzyme that catalyses the conversion of aspartate and alpha-ketoglutarate to oxaloacetate and glutamate.
   (B) The function of AST is to convert alanine, an amino acid found in proteins, into lgutamate and pyruvate, an important intermediate in cellular energy production.
   (C) The function of AST is to convert aspartate, an amino acid found in proteins, into creatine phosphate, an important intermediate in cellular energy production.
   (D) The function of ALT is to convert alanine, an amino acid found in proteins, into uric acid, an important intermediate in cellular energy production.

2. What are chondrocytes?
   (A) Cartilaginous tissue.
   (B) Adipose tissue.
   (C) Osteogenic tissues.
   (D) Fibroblastic tissues.

3. Label the correct oligodendrocyte marker
   (A) New N.
   (B) SOX-10.
   (C) Pdx 1
   (D) SSEA-1

4. How stem cells can be delivered into the spinal canal?
   (A) Intravenous.
   (B) Intra arterial.
   (C) Intrathecal.
   (D) Intramuscular.

5. What does the side scatter detect in the 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.

6. Where are cytotoxic T cells (CD8+) produced?
   (A) Bone marrow.
   (B) Lymph nodes.
   (C) Thymus.
   (D) Spleen.

7. Why cord blood transfusion can be an attractive method to treat ischemic and hypoxia induced injuries?
   (A) Cord blood has higher oxygen binding capacity.
   (B) Cord blood has lower oxygen binding capacity.
   (C) Cord blood has higher affinity for 2,3Diphosphophoglyceric acid.
   (D) Cord blood has no affinity 2,3Diphosphophoglyceric acid.

8. What is crossing over in genetics?
   (A) The swapping of non-genetic material that occurs in the germ line.
   (B) The swapping of genetic material that occurs in the germ line.
   (C) The swapping of genetic material that occurs in the somatic line.
   (D) The swapping of genetic material that occurs during mutation.

9. Why cord blood contains higher oxygen content than adult human blood?
   (A) Presence of adult haemoglobin.
   (B) Presence of foetal haemoglobin.
   (C) Because of high concentration of 2,3- DPG.
   (D) Because of the presence of two alpha and two beta chains.

10. Mesenchymal stem cells are:
   (A) Totipotent stem cells.
   (B) Unipotent stem cells.
   (C) Pluripotent stem cells.
   (D) Multipotent stem cells.

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

12. How would you identify stem cells developing into neuronal cells from a group of cells present in tissue culture?
   (A) By looking for specific neuronal markers like Nestin, NeuN, using flowcytometry & immunofluorescence
   (B) By looking for specific neuronal markers like SSEA-1 & GFAP
   (C) By looking for specific neuronal markers like SSEA-3 & Ki67
   (D) By looking for specific neuronal markers like SSEA-4 & Neu N

13. How would you identify from a karyotype that whether the individual is male or female?
   (A) Having X and Y chromosomes.
   (B) Having two X chromosomes with one of the X chromosomes inactivated.
   (C) Having X and O chromosomes.
   (D) Having two X and Y chromosomes.

14. 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 including apoptosis to cells, providing immunity to the are from further wound, and angiogenesis.
    (C) A type of new connective tissue, and microscopic blood vessels and have functions like including necrosis, providing immunity to the are 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.

15. 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-organised 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-organised 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 tissues complexity and structural organization of a specific organ.

16. Label which stain is used to mark the nucleus of a stem cell during imaging in Fluorescence microscope:
    (A) TRITC.
    (B) FITC.
    (C) F-ACTIN.
    (D) DAPI.

17. How does DAPI stain works to stain the nucleus?
    (A) DAPI binds to the major groove of the double stranded DNA with a preference for the GC clusters.
    (B) DAPI binds to the major groove of the double stranded DNA with a preference for the AT clusters.
    (C) DAPI binds to the minor groove of the double stranded DNA with a preference for the AT clusters.
    (D) DAPI binds to the minor groove of the double stranded DNA with a preference for the GC clusters.

18. What 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 CD11b.
    (B) Mesenchymal stem cells are pluripotent stem cells and are characterized by CD markers CD38, CD44 and CD11b.
    (C) Mesenchymal stem cells are multipotent stem cells and are characterized by CD markers CD29, CD90 and CD73.
    (D) Mesenchymal stem cells are mesenchymal stem cells and are characterized by CD markers CD25, CD56 and CD11b.

19. 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.

20. 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) Decellularized organs or membranes are used in cell culture expansion protocoins.
    (C) Decellularized organs or membranes have cells that can help in regeneration of a tissue.
    (D) Decellularized organs or membranes can be used as explant culture.

21. What is explant culture?
    (A) The culture of small pieces of tissue surgically removed from 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.

22. Where are B lymphocytes produced in the body?
    (A) Thymus.
    (B) Liver.
    (C) Bone Marrow.
    (D) Lymph nodes.

23. 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.

24. 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.

25. Which of the following statement is true for xeno free stem cell culture medium?
    (A) Xeno free stem cell culture medium reduces the chances of Xeno contamination if used for clinical purposes.
    (B) It reduced the cost of stem cell culture.
    (C) It introduced impurities that interferes with the quality of stem cell product in vitro.
    (D) Xeno free is not used in modern stem cells culture methods.

26. 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 cells thereby maintaining the homeostatic of the tissue.
    (C) By undergoing asymmetric division and thereby producing one stem cell and the other progenitor cells which further differentiates into an adult cell or a tissue specific cell.
    (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 cells of a specific tissue or organ.

27. 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.

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

29. Repeated exposure of the teeth to gastric contents results in:
    (A) Abrasion.
    (B) Caries.
    (C) Attrition.
    (D) Erosion.

30. In animal research, apart from institutional ethics committee, it is also monitored by another organization, also known as:
    (A) CPCSEA.
    (B) ICMR.
    (C) DCGI.
    (D) CDCSO.

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

32. Karyotyping is a technique by which one can identify the set of chromosomes and detect and disease or anomaly in the chromosomes structure or number. One of them is Klinefelters syndrome. How is Klinfelters syndrome represented by chromosome numbers?
    (A) 47, XYY.
    (B) 47, XXY.
    (C) 46, XY.
    (D) 46, XX.

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

34. 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.

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

36. What are monoclonal antibodies?
    (A) These are identical immunoglobulin, generated from a single B-cell clone.
    (B) These are different immunoglobulin, generated from a multiple B-cell clone.
    (C) These are non-identical immunoglobulin, generated from a single B-cell clone.
    (D) These are identical immunoglobulin, generated from a single T-cell clone.

37. To identify a specific protein from a group of proteins, which technique you would use?
    (A) Southern Blotting.
    (B) SDS PAGE.
    (C) Western Blotting.
    (D) Northern Blotting.

38. Who was awarded the Nobel Prize in 1993 in chemistry for inventing PCR?
    (A) Kary Mullins.
    (B) Barbara McClintock.
    (C) Alec Jeffreys.
    (D) Eva Engvall and peter Perlmen.

39. 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.

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

41. Which of the following statements explains 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 phenotype expression also.
    (C) Contains two different types of DNA or cells in a single organism and produced 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.

42. 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 acid.
    (D) Phenol red can be used a substitute for antibiotics and anti fungal in stem cells culture media.

43. 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 & 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 any foreign pathogens.

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

45. What is the importance of French Flag in stem cell medicine?
    (A) It shows the rate at which a stem cell proliferates or undergoes self-renewal, the red means no proliferation, white means sub-par or not optimal proliferation and blue means above par or optimal proliferation of stem cells.
    (B) It shows the effect of morphogens on stem cell differentiation, with white meaning not enough morphogen, red meaning negative concentration of the morphogen and blue meaning enough morphogen concentration to active stem cell differentiation.
    (C) It relates to the upregulation & downregulation of Cancer genes in the Cancer stem cells, with white showing no upregulation of the genes in Cancer stem cells, red showing downregulation of the genes in the Cancer stem cells & 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 are labelled as blue, multipotent stem cells are labelled as white & the impotent stem cells are labelled as red.

46. What causes background noise in fluorescence microscopy while analyzing a specific type of stem cells?
    (A) Depends on the nature of the fluorochrome used and its wavelength.
    (B) Too much of specific binding of the fluorophores to the stem cells.
    (C) Unbound on non-specific binding of the dye resulting in auto fluorescence.
    (D) It happens when an appropriate dye is not used specific to the stem cell in the sample.

47. What is a dizygotic twin?
    (A) Formed from two eggs 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.

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

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

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

51. 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.

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

53. 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.

54. Northern Blotting is used to detect:
    (A) DNA.
    (B) Protein.
    (C) RNA.
    (D) VIRUS.

55. Alkaline phosphatase is used as a marker for which type of stem cells?
    (A) It is an enzyme 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 foetal stem cells only and is therefore a marker of feta stem cells.
    (C) It is an enzyme that is highly up regulated in mesenchymal stem cells only and therefore a bio marker for mesenchymal stem cells.
    (D) It is an enzyme that is highly up regulated in hematopoietic stem cells.

56. 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.

57. What is transdifferentiation of stem cells?
    (A) Conversion of stem cells from an immatured to a matured state.
    (B) Differentiation of stem cells, into transit amplifying cells.
    (C) Conversion of stem cells from one cell/tissue lineage to another completely new cell/tissue lineage.
    (D) The inability of stem cells to differentiate into adult cells of the same tissue/ organ.

58. What medical procedure would you follow to detect a patient with meningitis apart from blood tests and CT scans?
    (A) Lamiectomy.
    (B) Lumbar puncture.
    (C) Deep brain stimulation.
    (D) Intrathecal injection.

59. What does the forward scatter detect in the flow cytometry of stem cells?
    (A) Size of the stem cells.
    (B) The complexicity of 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.

60. Where are ctotoxic T cells(CD8+) produced?
    (A) Bone marrow.
    (B) Lymph nodes.
    (C) Thymus.
    (D) Spleen.

61. What are the 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 1A, Class IIA.

62. Structurally how does fetal hemoglobin differs from adult hemoglobin?
    (A) HbF or fetal hemoglobin has two alpha and two Gamma sub units, whereas HbA or adult haemoglobin has two alpha and two beta sub units.
    (B) HbF or fetal hemoglobin has two alpha and two beta sub units whereas HbA or adult hemoglobin has tow alpha and two gamma sub units.
    (C) HbF or fetal hemoglobin has two aplha and two Delta sub units whereas HbA or adult hemoglobin has two alpha and two beta sub units.
    (D) HbF or fetal hemoglobin has two alpha and two beta sub units whereas HbA or adult hemoglobin has two alpha and two delta sub units.

63. What does cell mediated immunity involves?
    (A) Involves plasma cells and antibodies.
    (B) Involves granulocytes predominantly.
    (C) Involves NK cells, macrophages, CD4 T helper and CD8 Cytotoxic T cells.
    (D) None of the above

64. Why porous scaffolds are important for stem cell tissue engineering ?
    (A) Porous scaffolds give support to specific tissues like cartilage & muscle for support & cells cannot be seeded.
    (B) Porous scaffolds helps in the synthesis of collagen I.
    (C) Porous scaffolds helps in cell adhesion, proliferation & growth.
    (D) Porous scaffolds helps in the synthesis of collagen II.

65. What is the difference between blast & colony forming unit cells?
    (A) Blast consists of more primitive cells & can grow for a longer generation whereas colony forming units consists of less primitive or more progenitors cells and therefore cannot grow for a longer generation.
    (B) Both blast & colony forming units are the same as they both contain primitive hematopoietic stem cells that can grow for longer generation.
    (C) Blast consists of more progenitor cells & can grow for a longer generation whereas colony farming unit consists of more primitive cells and therefore cannot grow for a longer generation.
    (D) Blast are the primitive hematopoietic stem cells for more and colony forming unit cells are the primitive hematopoietic stem cells for human.

66. What is the difference between chemokines and cytokines?
    (A) Cytokine is a general term used for all signaling molecules while chemokines are specific cytokines that functions by attracting cells to sites of infections /inflammations.
    (B) Cytokine is a term used for migrating cells while chemokines are specific cytokines that functions as growth factors for cells.
    (C) Cytokins is a term used for cells secreting growth factors only while chemokines are specific cytokines that functions as migratory factors for cells.
    (D) Cytokine is a term used for migrating cells while chemokines code for both anti and pro inflammatory interleukins.

67. What is apoptosis?
    (A) Sudden insult to the cell resulting in mitochondrial dysfunction and production of reactive oxygen species.
    (B) The process by which cell increases in their overall size. Swell up and release the intracellular contents.
    (C) Programmed cell death by which cells decrease in their size and forms bleb.
    (D) The process by which cell increase in their overall size,swell up and release the intracellular contents in the form of apoptopic bodies.

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

69. What does Collagen II synthesize?
    (A) Main component of the organic part of bone.
    (B) Main collagenousComponent of cartilage.
    (C) Main components of recticular fibres.
    (D) Adipocytes will be synthesized.

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

71. What is the most abundant protein in our body?
    (A) Fibronectin.
    (B) Collagen.
    (C) Laminin.
    (D) Elastin.

72. What is rheumatoid arthiritis?
    (A) A chronic inflammatory disorder affecting many joints including those in the hands and feet.
    (B) It occurs when the protective cartilage that cushions the ends of the bones wears down over time damaging any joint, the disorder.
    (C) A chronic inflammatory disorder affecting the anterior cruciate ligaments of the knee.
    (D) A chronic inflammatory disorder affecting the posterior cruciate ligaments if the knees.

73. What is adipocytes?
    (A) Cartilaginous tissues.
    (B) Fat tissues.
    (C) Bone forming tissues.
    (D) Fibroblastic tissues.

74. The development and formation of bone is also defined as:
    (A) Chondrogenisis.
    (B) Adipogenesis.
    (C) Osteogenisis.
    (D) Calcification.

75. What is inflammation?
    (A) Body's immune system's response to an irritant.
    (B) Body's immune system's response to cancer.
    (C) Body's immune system's response to apoptisis.
    (D) Body's immune system's response to necrosis.

76. Who is regarded as the father of genetics?
    (A) Charles Darwin.
    (B) Jean Baptiste Lamarck.
    (C) Francis crick.
    (D) Gregor Mendel.

77. How would you identify the potency of hematopoietic stem cells?
    (A) Formation of teratomas.
    (B) Formation of colony forming units.
    (C) Formation of adipocytes.
    (D) Formation of osteocytes.

78. What is hypoxia?
    (A) Low oxygen in blood.
    (B) Low oxygen in tissues.
    (C) High oxygen concentration in the blood.
    (D) High oxygen concentration in the tissues.

79. Mark the correct answer that is a marker for inflammation?
    (A) Creactive protein.
    (B) Creatinine.
    (C) Albumin.
    (D) Urea.

80. What is totipotent stem cell?
    (A) Can give rise to all the three germ layers i.e. ectoderm , endoderm and mesoderm.
    (B) Can give rise to all the three germ layers i.e. ectoderm, endoderm and mesoderm including the extra embryonic tissues.
    (C) Can give rise to the germ cells.
    (D) Can give rise to the cancer cells.

81. What is aminocentesis?
    (A) A procedure used to take out a small sample of the amniotic fluid for testing.
    (B) A procedure used to take out a small sample of the amniotic membrane for testing.
    (C) A procedure used to take out a small sample of the mesenchymal stem cells from the amniotic fluid for testing.
    (D) A procedure used to take out a small sample of the erythoid cells from the amniotic fluid for testing.

82. What is the role of fibrinogen in blood plasma?
    (A) Helps in maintaining oncotic pressure.
    (B) It is the coagulation protein.
    (C) It helps in transferring salts lipids and hormones.
    (D) It helps in production of the immunoglobulin.

83. What is primary stem cell culture?
    (A) Second generation stem cells obtained from the parent generation.
    (B) Stem cells directly isolated from humans and animals.
    (C) Stem cells that is transformed or genetically engineered.
    (D) Stem cells that have mutated from their original cells.

84. What is metastasis?
    (A) When cancer cells break away from primary cancer, travel through the blood or lymph system, and form new tumours.
    (B) When cancer cells break away from secondary cancer travel through the blood or lymph system, and form new tumours.
    (C) When normal cells break away from secondary cancer, travel through the blood lymph system, and form new tumours.
    (D) When abnormal but not cancer cells break away from secondary cancer, travel through the blood or lymph system, and form new tumours.

85. What is osteoarthiritis?
    (A) A chronic inflammatory disorder affecting many joints including those in the hands and feet.
    (B) It occurs when the protective cartilage that cushions the ends of the bones wears down over time, damaging any joints, the disorder most commonlyaffects the joints in your hands, knees, hips and spine.
    (C) A chronic inflammatory disorder affecting the anterior cruciate ligaments of the knees.
    (D) A chronic inflammatory disorder affecting the posterior cruciate ligaments of the knees.

86. What is serum blood urea nitrogen test?
    (A) The level of urea present in the blood.
    (B) The level of nitrogen present in the blood.
    (C) The level of waste (together urea+nitrogen) in the blood.
    (D) The level of creatinine in the blood.

87. Which is the most abundant immunoglobin in our body?
    (A) IgM.
    (B) IgE.
    (C) IgA.
    (D) IgG.

88. What are amniocytes?
    (A) These are foetal cells of the immune complement system.
    (B) These are foetal cells of the amniotic membrane.
    (C) These are foetal cells of the amniotic fluid.
    (D) These are foetal cells if the umbilical cord matrix.

89. Patients with chronic granulomatous disease are found to have which type of serious disease frequently?
    (A) Pneumonia.
    (B) Osteopenia.
    (C) Chronic myeloid leukemia.
    (D) Multiple myeloma.

90. What type of antibiotic is gentamycin?
    (A) Cephalosporine.
    (B) Penicillin.
    (C) Tetracycline.
    (D) Aminoglycosides.

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

92. hCG (Human chronic gonadotrophin) hormone is secreted by which type of cells?
    (A) hCG, is produced specifically by the villious syncytiotrophoblast cells as pregnancy progresses.
    (B) hCG, is produced specially by the hypoblast cells as pregnancy progresses.
    (C) hCG, is produed specifically by the epiblast cells as pregnancy progresses.
    (D) hCG, is produced specifically by the primordial germ cells as pregnancy progresses.

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

94. Mark the correct stem cell marker for pluripotent stem cells:
    (A) Sca-1.
    (B) Stro-2.
    (C) Vimentin.
    (D) Oct-3/4.

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

96. Thrombopoiesis is also defined as:
(A) Formation of retiuloendothelial cells.
(B) Formation of erthocytes.
(C) Formation of bone marrow cells.
(D) Formation of platelets.

97. What is the role of matrix metalloproteinases in Cancer metastasis?
(A) Helps in promotion of fibroblast.
(B) Helps in promotion of mesenchymal stem cells.
(C) Helps in activation of apoptotic pathway.
(D) Helps in degradation of both matrix and non-matrix protin.

98. Gamma Amino Buytric Acid or commonly called as GABA is a:
(A) Neuroinhibitor.
(B) Neurotransmitter.
(C) Contact inhibitor.
(D) Contact excitor.

99. 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 cell mass of a donated embryo & are cultured in vitro for further therapeutic use.
(B) In therapeutic cloning the enucleated egg is fused with the somatic cell nucleus & then transplanted in a surrogate mother for further development in blastocyst stage for further therapeutic use.
(C) In therapeutic cloning the enucleated somatic cell is fused with somatic cell nucleus then cultured under in vitro conditions till the formation of inner cell mass 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 inner cell mass of the blastocyst stage from where embryonic stem cells can be collected & transplanted in a surrogate mother for further development into blastocyst stage for further therapeutic use.

100. Where keratinocytes are present?
(A) Dermis.
(B) Hypodermis.
(C) Epidermis.
(D) Basement membrane.