



## Dr.G.R.Damodaran College of Science

(Autonomous, affiliated to the Bharathiar University, recognized by the UGC) Re-accredited at the 'A' Grade Level by the NAAC and ISO 9001:2008 Certified CRISL rated 'A' (TN) for MBA and MIB Programmes

II MSC [2016-2018]

SEMESTER III

CORE: MEDICAL BIOTECHNOLOGY-358C

Multiple Choice Questions.

1. Which of the following procedures can be used to identify Down syndrome pre-natally?

- A. Amniocentesis.
- B. Amnioprolaxis
- C. Amniophalaxi
- D. Amniocalesis

ANSWER: A

2. Germline Therphy is a

- A. Heritable
- B. Inheritable
- C. sometimes heritable
- D. not related to heridity

ANSWER: A

3. The first gene therapy used cells altered outside the recipient's body and is called \_\_\_\_ gene therapy

- A. in vivo
- B. ex vivo
- C. in silico
- D. None

ANSWER: B

4. Amniocentesis is performed during \_\_\_\_\_.

- A. Fourth week of gestation
- B. Tenth week of gestation
- C. Fifteenth week of gestation.
- D. Twenty fourth week of gestation

ANSWER: C

5. The sample used for amniocentesis is \_\_\_\_\_.

- A. Chorionic villi
- B. Amniotic fluid
- C. Placenta.
- D. Umbilical cord.

ANSWER: B

6. A photograph of a cell's chromosomes arranged in pairs according to size is called\_\_\_\_\_.

- A. Karyotype
- B. Histogram
- C. Idiogram
- D. Cardiogram

ANSWER: A

7. Infertility is the inability to conceive a child after \_\_\_\_ year(s) of frequent intercourse without the use of contraceptives.

- A. 1
- B. 3
- C. 5
- D. 9

ANSWER: C

8. In a developing embryo, stem cells can differentiate into

- A. ectoderm
- B. endoderm
- C. mesoderm
- D. all of above

ANSWER: D

9. Which of the following is not a vector used in gene therapy?

- A. AAV
- B. Herpes
- C. Retrovirus
- D. HIV

ANSWER: D

10. Which of the following is NOT produced in the adrenal cortex?

- A. Male sex hormones.
- B. Aldosterone.
- C. Cortisol
- D. Adrenalin.

ANSWER: D

11. Gluconeogenesis is best matched with which hormone?

- A. Cortisol.
- B. ADH
- C. Glucagon
- D. Thyroxine

ANSWER: A

12. The term cancer means \_\_\_\_\_.

- A. Cell division
- B. Out of control
- C. Lobster
- D. All the above

ANSWER: D

13. Too much GH in an adult results in \_\_\_\_\_.

- A. Gigantism
- B. Acromegaly
- C. Simmond's disease.
- D. Diabetes insipidus

ANSWER: B

14. Cyclic AMP is best matched with \_\_\_\_\_.

- A. Steroid hormones
- B. Protein hormones

- C. Muscle cells.
- D. The male hormone, testosterone.

ANSWER: B

15. Classical endocrine glands such as the pituitary, thyroid and adrenal gland \_\_\_\_\_.
- A. Have ducts.
  - B. Produce many different products.
  - C. Produce hormones.
  - D. Use the product locally.

ANSWER: C

16. The primary effect of calcitonin is to \_\_\_\_\_.
- A. Increase blood glucose
  - B. Decrease blood glucose
  - C. Increase excretion of calcium ions in urine
  - D. Decrease blood calcium by blocking release from the bone

ANSWER: D

17. An increase in blood glucose and an anti-inflammatory effect are important effects of \_\_\_\_\_.
- A. Epinephrine
  - B. Glucagons
  - C. Cortisol
  - D. Insulin

ANSWER: C

18. Which assisted reproductive technology has been used for the longest time period?
- A. intracytoplasmic sperm injection
  - B. artificial insemination
  - C. in vitro fertilization
  - D. gamete intrafallopian transfer

ANSWER: B

19. The Islets of Langerhans are the endocrine portion of the \_\_\_\_\_.
- A. Adrenal cortex.
  - B. Adrenal medulla.
  - C. Anterior pituitary.
  - D. Pancreas

ANSWER: D

20. The only hormone that promotes the anabolism (building up) of glycogen, fats, and proteins is \_\_\_\_\_.

- A. GH
- B. Insulin
- C. Epinephrine
- D. Aldosterone

ANSWER: B

21. Types of stem cells in mammals are
- A. 2
  - B. 3
  - C. 4
  - D. 5

ANSWER: A

22. \_\_\_\_\_ is the success of modern medicine depends on the detection of specific molecules
- A. Molecular diagnostics.
  - B. Molecular biology.
  - C. Genetic engineering.
  - D. All the above.

ANSWER: A

23. Transgenic Mouse is an example of
- A. constitutional gene therapy
  - B. heritable gene therapy.
  - C. germline gene therapy.
  - D. somatic gene therapy.

ANSWER: C

24. Diabetes insipidus results from \_\_\_\_\_.
- A. Hyposecretion of insulin
  - B. Hypersecretion of insulin.
  - C. Hyposecretion of aldosterone.
  - D. Hyposecretion of ADH.

ANSWER: D

25. The function of adenyl cyclase is to \_\_\_\_\_.
- A. Break down a protein hormone when it binds to its receptor.
  - B. Turn on a G-protein.
  - C. Cause the conversion of ATP to cAMP.
  - D. Activate a protein kinase; inactivate cAMP.

ANSWER: B

26. Destruction of the beta cells of the pancreas results in \_\_\_\_\_.
- A. Type I diabetes (insulin-dependent).
  - B. Type II diabetes (insulin-nondependent).
  - C. Diabetes insipidus.
  - D. Hyperglycemia.

ANSWER: A

27. When a hormone name ends in "tropic," what does this mean?
- A. a. The hormone stimulates the metabolism of the cell it contacts.
  - B. b. It meant the hormone affects another "target" endocrine gland.
  - C. c. It meant the hormone always enters the cell and turns on and off portions of the cell's DNA.
  - D. d. It means it is a posterior pituitary hormone.

ANSWER: B

28. Which gland produces calcitonin?
- A. Parathyroids
  - B. Thyroid
  - C. Adrenal cortex.
  - D. Adenohypophysis

ANSWER: B

29. HIV/AIDS is transmitted through \_\_\_\_\_.
- A. Semen and breast milk.
  - B. Vaginal secretions.
  - C. Blood
  - D. All the above.

ANSWER: D

30. Why are neurons difficult targets for gene therapy?

- A. they are not easily accessible
- B. they are small
- C. they do not divide
- D. they lack a nucleus

ANSWER: C

31. A man can have up to \_\_\_\_% abnormal sperm and still be considered fertile

- A. 20
- B. 40
- C. 50
- D. 60

ANSWER: B

32. The pancreas which produces two hormones namely \_\_\_\_\_

- A. Epinephrine and insulin.
- B. Melatonin and glucagons.
- C. Insulin and glucagons.
- D. Glucagon and norepinephrine.

ANSWER: C

33. Which hormone is produced in the Beta cells of the islets of Langerhans?

- A. Melatonin
- B. Glucagons
- C. Insulin.
- D. Calcitonin.

ANSWER: C

34. The target of the hormone erythropoietin is \_\_\_\_\_.

- A. White blood cells.
- B. Kidney
- C. Bone marrow.
- D. Right atrium of the heart.

ANSWER: B

35. Which of the following is a cytokine that acts mainly to activate B-cells to proliferate?

- A. Interleukin 1.
- B. Interleukin 2.
- C. Interleukin 4.
- D. Interleukin 10.

ANSWER: C

36. HIV/AIDS is \_\_\_\_\_.

- A. One of the greatest challenges facing the world in the 21st century.
- B. An emergency of an unprecedented nature.
- C. Such a global disaster and threat to the world population.
- D. All of the above.

ANSWER: D

37. .... is a group of inherited disorders that drastically compromises innate and adaptive immune responses.

- A. Typhoid

- B. Malaria
- C. Dengue.
- D. SCID

ANSWER: D

38. Lyme disease is a \_\_\_\_\_ disease.

- A. Fungal
- B. Bacterial
- C. Viral
- D. Protozoan

ANSWER: B

39. Which one of the following test is NOT applicable for the diagnosis of Cystic Fibrosis?

- A. Lung function tests.
- B. Amniocentesis.
- C. Chorionic villus biopsy.
- D. Uterine Ultrasound.

ANSWER: D

40. How does cystic fibrosis is treated?

- A. By preventing or fighting lungs infections.
- B. By loosening and removal mucus from lungs.
- C. By preventing intestinal blockage.
- D. All the above.

ANSWER: D

41. What hormone is primarily responsible for glucose storage as glycogen; stimulating fat storage and stimulate protein synthesis?

- A. GH
- B. TSH
- C. Insulin
- D. Cortisol

ANSWER: C

42. Oocytes can be frozen in liquid nitrogen. At which phase of the cell cycle are these cells at the time of freezing?

- A. meiosis, metaphase I
- B. meiosis, metaphase II
- C. mitosis, metaphase
- D. meiosis or mitosis, interphase

ANSWER: B

43. About 50% of all human cancers may involve an abnormal or missing \_\_\_\_\_.

- A. Oncogene
- B. Proto-oncogene.
- C. p53 gene.
- D. BRCA-1 gene.

ANSWER: C

44. Inherited retinoblastoma requires \_\_\_\_\_ mutation(s) or deletion(s).

- A. 1
- B. 2
- C. 3
- D. 4

ANSWER: B

45. Which of the following is NOT a characteristic of cancer cells?

- A. Loss of cell cycle control.
- B. Transplantability.
- C. Loss of contact inhibition.
- D. All the above.

ANSWER: D

46. The Philadelphia chromosome is associated with \_\_\_\_\_ type of cancer.

- A. Breast
- B. Thyroid
- C. Nerve
- D. Leukemia

ANSWER: D

47. Which cell type would not be a direct target for gene therapy?

- A. RBC
- B. Muscle
- C. Liver
- D. Endothelium

ANSWER: A

48. An increasing number of women in the rural south die from \_\_\_\_\_ cancer.

- A. Breast
- B. Colon
- C. Lung
- D. Mouth

ANSWER: C

49. Which of the following statements about telomerase is incorrect?

- A. It is an enzyme that adds DNA to telomeres.
- B. It serves as the template for telomeres lengthening.
- C. It is not activated in cancer cells.
- D. Its activity continually resets the cellular clock.

ANSWER: C

50. Familial cancer is caused by \_\_\_\_\_.

- A. A mutation in somatic cells only.
- B. A mutation in germline cells only.
- C. A germline mutation plus a somatic mutation in affected tissue.
- D. Two germline mutations.

ANSWER: C

51. Which type of cancer in humans is directly caused by a viral infection?

- A. Acute T cell leukemia.
- B. Wilms' tumor.
- C. Rous sarcoma.
- D. Burkitt's lymphoma.

ANSWER: A

52. An oncogene transcribed and translated with another gene produces a \_\_\_\_\_.

- A. Transcribed protein.
- B. Fusion protein.

- C. Fusion cell.
- D. Cancer protein.

ANSWER: C

53. The p53 protein normally promotes \_\_\_\_\_.

- A. DNA repair.
- B. Tumor formation.
- C. Cell division.
- D. Apoptosis.

ANSWER: D

54. The p53 gene is especially prone to \_\_\_\_\_.

- A. Point mutation.
- B. Chromosomal rearrangement.
- C. Loss
- D. Transposition

ANSWER: A

55. Which of the following cancers develops from loss of tumor suppression?

- A. Acute T cell leukemia.
- B. Wilms' tumour.
- C. Burkitt's lymphoma.
- D. Rous sarcoma.

ANSWER: B

56. Which of the following is NOT a traditional cancer treatment?

- A. Blocking telomerase.
- B. Inhibiting angiogenesis.
- C. Stimulating specialization.
- D. None of the above.

ANSWER: D

57. A mutation in which gene makes nearby DNA more susceptible to replication errors?

- A. APC
- B. BRCA1
- C. p53
- D. RB

ANSWER: A

58. Which of the following may NOT contribute cancer?

- A. A mutation in a gene that slows the cell cycle.
- B. Faulty DNA repair.
- C. Loss of control over telomere length.
- D. Tumor suppressor genes.

ANSWER: D

59. Louise Brown, the first test-tube baby, was conceived using which assisted reproductive technology?

- A. artificial insemination
- B. gamete intrafallopian transfer
- C. intracytoplasmic sperm injection
- D. in vitro fertilization

ANSWER: D



60. Which of these serious health problems has NOT been linked to obesity?

- A. Type 2 diabetes.
- B. Heart disease.
- C. High blood pressure.
- D. Cancer

ANSWER: D

61. The rate of migration of DNA within an agarose gel in the gel electrophoresis technique is primarily based on what factor?

- A. The size of the DNA fragments.
- B. The number of DNA fragments.
- C. The size of the wells of the gel.
- D. The negative charge of the DNA.

ANSWER: A

62. Oligonucleotide gene probes are defined as \_\_\_\_\_.

- A. The pieces of DNA produced by restriction endonucleases.
- B. An enzyme important in splicing genes into plasmids and chromosomes.
- C. A short stretch of DNA of a known sequence that will base-pair with a complementary sequence.
- D. A piece of DNA to which new nucleotides are added during DNA sequencing.

ANSWER: C

63. The technique that utilizes probes to detect specific DNA sequences is known as what?

- A. Southern blot.
- B. Northern blot.
- C. Eastern blot.
- D. Western blot.

ANSWER: A

64. Which of the following statements regarding the polymerase chain reaction is untrue?

- A. It can increase the amount of DNA in a sample.
- B. It has the potential of diagnosing an infection from a single copy of a gene.
- C. It utilizes DNA polymerases from psychrophilic organisms.
- D. It can amplify DNA of only a few base pairs up to a whole genome.

ANSWER: C

65. In the year 1980s, XSCID patient named David Vetter (1971-1984) lived in a \_\_\_\_\_ and died at age 13.

- A. water.
- B. gas
- C. air
- D. bubble.

ANSWER: D

66. Which of the following is NOT a source for stem cells?

- A. certain adult tissues
- B. umbilical cord blood
- C. early embryos
- D. sperm and eggs

ANSWER: D

67. Good cloning vectors must possess all EXCEPT which of the following qualities?

- A. They should possess their own origin of replication.
- B. They should be readily accepted by the cloning host.

- C. They should be easily manipulated.
- D. They should be resistant to restriction endonucleases.

ANSWER: D

68. The creation of a DNA fingerprint involves all EXCEPT which of the following techniques?

- A. Southern blotting.
- B. Western blotting.
- C. Polymerase chain reaction.
- D. Gel electrophoresis.

ANSWER: A

69. All methods of DNA fingerprinting depend on some variation of \_\_\_\_\_ strategy.

- A. RFLP
- B. GMOs
- C. Gene therapy.
- D. Nucleic acid hybridization.

ANSWER: A

70. Diagnosis of chromosome aneuploidy of unborn children is normally done by combination of amniocentesis, cell culture, and \_\_\_\_\_.

- A. Enzyme assay.
- B. RFLP analysis.
- C. Pedigree analysis.
- D. Karyotyping.

ANSWER: D

71. A man and woman, each with a family history of sickle cell disease and no children would benefit most by

- A. prenatal screening
- B. inherited predisposition screening.
- C. no screening because they already know their status.
- D. carrier screening.

ANSWER: D

72. Which of the following is NOT a marker used in disease diagnosis?

- A. RFLP
- B. VNTRs
- C. STRs
- D. PCR

ANSWER: D

73. Complications of Cystic Fibrosis include \_\_\_\_\_.

- A. Asthma
- B. Pneumonia
- C. Bronchitis
- D. All the above.

ANSWER: D

74. Cutting certain genes out of molecules of DNA requires the use of special \_\_\_\_\_.

- A. Degrading nucleases.
- B. Restriction endonucleases.
- C. Eukaryotic enzymes.
- D. Viral enzymes.

ANSWER: B

75. The enzyme used in the Polymerase Chain Reaction is \_\_\_\_\_.

- A. Restriction endonuclease.
- B. Reverse transcriptase.
- C. DNA polymerase.
- D. RNA polymerase.

ANSWER: C

76. A method used to distinguish DNA of one individual from another is \_\_\_\_\_.

- A. PCR.
- B. RFLP
- C. RAPD
- D. SAGE

ANSWER: B

77. Malaria is caused by \_\_\_\_\_.

- A. Plasmodium falciparum
- B. Entamoeba sp
- C. T4 phage
- D. Pseudomonas sp

ANSWER: A

78. An insect which transmits a disease is known as a \_\_\_\_\_.

- A. Intermediate host.
- B. Parasite.
- C. Vector
- D. Prey

ANSWER: C

79. Which is more critical to successful natural fertilization

- A. Sperm Quality
- B. Sperm Quantity
- C. Both
- D. None

ANSWER: A

80. Which one of the diseases is not communicable?

- A. Typhoid
- B. Leprosy
- C. Measles
- D. Leukemia

ANSWER: D

81. Congenital diseases are those which \_\_\_\_\_.

- A. Are deficiency diseases.
- B. Are present from time of birth.
- C. Are spread from man to man.
- D. Occur during life time.

ANSWER: B

82. Specifically, which cells are harvested from the early embryo?

- A. enucleated cells
- B. all cells
- C. inner cell mass

D. umbilical cord cells  
ANSWER: C

83. AIDS virus has \_\_\_\_\_.
- A. Single strand DNA.
  - B. Double strand DNA.
  - C. Single strand RNA.
  - D. Double strand RNA.

ANSWER: C

84. AIDS is caused due to the/an \_\_\_\_\_.
- A. Reduction in number of helper T-cell.
  - B. Reduction in number of killer T-cell.
  - C. Auto-immunity.
  - D. Non-production of interferons.

ANSWER: A

85. Which of the following is a mismatch?
- A. Leprosy - Bacterial infection.
  - B. AIDS - Bacterial infection.
  - C. Malaria - Protozoan infection.
  - D. Elephantiasis - Nematode infection.

ANSWER: B

86. Genetic engineering of eukaryotic cells is accomplished using \_\_\_\_\_.
- A. Direct injection of DNA into fertilized eggs.
  - B. Retroviral vectors.
  - C. Gene targeting.
  - D. All of the above.

ANSWER: D

87. Differing sizes of restriction fragments produced from the alleles of a gene constitute \_\_\_\_\_.
- A. A Southern blot.
  - B. An allozyme.
  - C. Identification of a gene.
  - D. A restriction fragment length polymorphism.

ANSWER: D

88. Enzyme that cleaves DNA at sequence-specific sites is called \_\_\_\_\_.
- A. DNA polymerase.
  - B. Ligase
  - C. Restriction endonuclease.
  - D. Sticky ends.

ANSWER: C

89. Some B-lymphocytes fused with tumour cells to produce a hybrid cell called a \_\_\_\_\_.
- A. hybridoma.
  - B. Tcells
  - C. Probes
  - D. All the above.

ANSWER: A

90. An enzyme found in retroviruses (like HIV) that can be used to prepare DNA fragments from mRNA is called \_\_\_\_\_.

- A. Reverse transcriptase.
- B. RNA polymerase.
- C. DNA polymerase.
- D. Integrase

ANSWER: A

91. Sticky and thick mucus is a symptom of \_\_\_\_\_.

- A. Huntington chorea.
- B. Cystic fibrosis.
- C. Diabetes
- D. Haemophilia.

ANSWER: B

92. In Turner's syndrome the karyotype shows \_\_\_\_\_.

- A. 47 chromosome (Trisomy of 21).
- B. 47 chromosome (AA+XXY).
- C. 46 chromosome (AA+XY or XX).
- D. 45 chromosome (AA+XO).

ANSWER: D

93. In Down's syndrome the karyotype shows \_\_\_\_\_.

- A. 47 chromosome (Trisomy of 21).
- B. 47 chromosome (AA+XXY).
- C. 46 chromosome (AA+XY or XX).
- D. 45 chromosome (AA+XO).

ANSWER: A

94. A pregnant woman has the hormone \_\_\_\_\_ in her urine.

- A. Human Chorionic Gonadotrophin (HCG).
- B. Insulin.
- C. Thyroid.
- D. Adrenalin

ANSWER: A

95. \_\_\_\_\_ is antibodies that are derived from different cell lines.

- A. Monoclonal antibodies.
- B. Polyclonal antibodies.
- C. Primary antibodies.
- D. Secondary antibodies.

ANSWER: B

96. DNA fingerprinting was invented by \_\_\_\_\_.

- A. Alec Jeffreys.
- B. Sanger
- C. Maxam
- D. Watson

ANSWER: A

97. DNA profiling is the other name of \_\_\_\_\_.

- A. Karyotyping
- B. DNA fingerprinting.
- C. Southern blot.
- D. Northern blot.

ANSWER: B

98. Visualisation of the umbilical vessels by transabdominal ultrasound is called \_\_\_\_\_.

- A. Aminocentesis
- B. Ultrasound
- C. CVS
- D. Cordiocentesis

ANSWER: D

99. Visualisation of foetus by means of endoscope is called \_\_\_\_\_.

- A. Fetoscopy
- B. Endoscopy
- C. CVS
- D. Cordiocentesis

ANSWER: A

100. What are the indications for prenatal diagnosis?

- A. Advanced maternal age.
- B. Previous child with a chromosome abnormality.
- C. Family history of a chromosome abnormality.
- D. All the above.

ANSWER: D

101. From which organism the enzyme Taq polymerase was isolated \_\_\_\_\_.

- A. Homo sapiens.
- B. Drosophila melanogaster.
- C. Thermus aquaticus.
- D. Staphylococcus aurelia.

ANSWER: C

102. Somatic cell nuclear transplant uses material from a(n) \_\_\_\_\_ cell.

- A. adult
- B. blood
- C. surrogate
- D. embryonic

ANSWER: A

103. Which of the following is required for DNA amplification?

- A. Ribonucleotides.
- B. RNA primers.
- C. Thermostable DNA polymerase.
- D. RNA template.

ANSWER: C

104. Taq polymerase starts copying at/when \_\_\_\_\_.

- A. The end of free single-stranded RNA.
- B. Any open point.
- C. RNA primers attached to the end of the desired gene.
- D. DNA primers attached to the end of the desired gene.

ANSWER: D

105. PCR requires all of the following EXCEPT \_\_\_\_\_.

- A. Primers.
- B. DNA ligase.
- C. DNA of interest.

D. Deoxyribonucleotides.

ANSWER: B

106. \_\_\_\_\_ is an immunoassay technique to assess the presence, amount, and molecular weight of proteins in cellular or tissue extracts by using antibodies.

- A. ELISA
- B. Southern blotting
- C. PCR
- D. Western Blotting

ANSWER: D

107. The most likely source of the Taq polymerase used in PCR is a bacterium that lives in \_\_\_\_\_.

- A. Soil
- B. Arctic ice.
- C. Hot vents.
- D. Humans

ANSWER: C

108. Which of the following hybridize with the ends of the gene to be amplified?

- A. DNA primers.
- B. Deoxyribonucleotides.
- C. Ribonucleotides
- D. DNA molecules.

ANSWER: A

109. Which of the following synthesizes the complementary strands of DNA?

- A. Taq polymerase.
- B. Deoxyribonucleotides.
- C. Ribonucleotides.
- D. DNA molecules.

ANSWER: A

110. Causative Organism of lyme disease is \_\_\_\_\_.

- A. HIV.
- B. *Borrelia burgdorferi*
- C. *Plasmodium* sp.
- D. None of the above.

ANSWER: B

111. The \_\_\_\_\_ is a membrane surrounding the embryo that gives rise to the umbilical blood vessels.

- A. Yolk sac.
- B. Allantois.
- C. Chorionic villi.
- D. Trophoblast.

ANSWER: B

112. The deadliest parasite which causes 90% of malarial disease is \_\_\_\_\_.

- A. *Plasmodium vivax*.
- B. *Plasmodium falciparum*.
- C. *Plasmodium malariae*.
- D. *Plasmodium ovale*.

ANSWER: B

113. \_\_\_\_\_ and \_\_\_\_\_ can cause chronic malaria.
- A. *P. vivax* and *P. falciparum*.
  - B. *P. ovale* and *P. vivax*.
  - C. *P. falciparum* and *P. ovale*.
  - D. *P. malariae* and *P. ovale*.

ANSWER: B

114. ribed as \_\_\_\_\_.
- A. totipotent
  - B. multipotent
  - C. unipotent
  - D. pluripotent

ANSWER: C

115. Egg and sperm are \_\_\_\_\_.
- A. Monoploid.
  - B. Haploid.
  - C. Diploid.
  - D. Triploid.

ANSWER: B

116. The disease Typhoid is caused by \_\_\_\_\_.
- A. *S. paratyphi*.
  - B. *S. typhi*.
  - C. *S. enteritidis*.
  - D. *Shigella* sp.

ANSWER: B

117. Infectious disease is caused due to \_\_\_\_\_.
- A. Living organism.
  - B. Genetic variation.
  - C. Nutrient deficiency.
  - D. All the above.

ANSWER: A

118. Cancer is caused as a result of \_\_\_\_\_.
- A. Uncontrolled cell division.
  - B. Mutation.
  - C. Hereditary predisposition.
  - D. All the above.

ANSWER: D

119. AIDS is a pandemic disease as it \_\_\_\_\_.
- A. Spreads across whole continent.
  - B. Present at low level in a given population.
  - C. Spreads rapidly and later disappears.
  - D. Is originated from animals

ANSWER: A

120. Sickle cell anemia is caused due to \_\_\_\_\_.
- A. Point mutation in Beta-globin gene.
  - B. Frameshift mutation in Beta-globin gene.
  - C. Transversion in Beta-globin gene.
  - D. Inversion in Beta-globin gene.



ANSWER: A

121. In sickle cell anemia, the abnormal cells are destroyed in the \_\_\_\_\_.

- A. Spleen.
- B. Liver.
- C. Kidney.
- D. Pancreas.

ANSWER: A

122. Pick the odd statement out with respect to Cystic fibrosis.

- A. It is an inherited disorder.
- B. It is characterized by mucus secretion.
- C. It results in chronic respiratory disease.
- D. It is influenced by p53.

ANSWER: D

123. Pick out the odd statement concerned with stromal cells.

- A. They are hematopoietic cells.
- B. They support the growth of the hematopoietic cells.
- C. They promote the microenvironment for the cells.
- D. They possess immunomodulatory properties.

ANSWER: A

124. The stromal cells do NOT include \_\_\_\_\_.

- A. Fat cells.
- B. Epithelial cells.
- C. Fibroblast and macrophages.
- D. RBC.

ANSWER: D

125. Diseases are classified into \_\_\_\_\_.

- A. Infectious disease.
- B. Endocrine disease.
- C. Genetic disease.
- D. All the above.

ANSWER: D

126. The diagnosis of disease is important to \_\_\_\_\_.

- A. Give appropriate treatment.
- B. Induce the disease progression.
- C. Allow the pathogen to grow.
- D. Enhance the disease progression.

ANSWER: A

127. Traditional method of diagnosis of a disease includes \_\_\_\_\_.

- A. Biotyping.
- B. PCR.
- C. Ribotyping.
- D. Plasmid profiling.

ANSWER: A

128. Molecular method of disease diagnosis is carried out by \_\_\_\_\_.

- A. Biotyping.
- B. PCR.

- C. Protein analysis.
- D. Antibigram.

ANSWER: B

129. Which of the following terms best describes a test used detect disease before it presents clinically?

- A. Diagnostic test.
- B. Sensitive test.
- C. Screening test.
- D. Prognostic test.

ANSWER: C

130. The term use do describe the cause of a disease is \_\_\_\_\_.

- A. Manifestation.
- B. Etiology.
- C. Pathogenesis.
- D. Epidemiology.

ANSWER: B

131. The two DNA strands are held together by \_\_\_\_\_.

- A. Hydrophobic bond.
- B. Hydrogen bond.
- C. Vander waals forces.
- D. Covalent bond.

ANSWER: B

132. The enzyme alkaline phosphatase is predominantly found in \_\_\_\_\_.

- A. Pancreas.
- B. Liver.
- C. Kidney.
- D. Lungs.

ANSWER: B

133. The level of alkaline phosphatase will increase during \_\_\_\_\_.

- A. Liver disease.
- B. Renal failure.
- C. Lung failure.
- D. Heart related problem.

ANSWER: A

134. The bone forming cells called osteoblast produces \_\_\_\_\_.

- A. Creatinine kinase.
- B. Alkaline phosphatase.
- C. SGOT.
- D. SGPT.

ANSWER: B

135. The enzyme creatinine kinase is predominantly found in the \_\_\_\_\_.

- A. Heart.
- B. Liver.
- C. Pancreas.
- D. Kidney.

ANSWER: A

136. The normal value of creatine kinase is \_\_\_\_\_ IU/L.

- A. 2-40.
- B. 10-40.
- C. 60-400.
- D. 300-600

ANSWER: C

137. The isoforms of the creatine kinase is \_\_\_\_\_.

- A. CK-MM.
- B. CK-BB.
- C. CK-MB.
- D. All the above.

ANSWER: D

138. The normal value of the alkaline phosphatases ranges \_\_\_\_\_ IU/L.

- A. 20-140.
- B. 5-25.
- C. 20-40.
- D. 150-200.

ANSWER: A

139. Pick out the ODD one out.

- A. Biotyping.
- B. Ribotyping.
- C. Protein analysis.
- D. Antibigram.

ANSWER: B

140. The enzymes are \_\_\_\_\_.

- A. Biocatalyst.
- B. Inhibitors.
- C. Activators.
- D. Enhancers.

ANSWER: A

141. Cell based therapy is possible by \_\_\_\_\_.

- A. Stem cells.
- B. Differentiated cells.
- C. Specialized cells.
- D. Adult cells.

ANSWER: A

142. Which of the following statement relating to cystic fibrosis is/are correct?

- A. Cystic fibrosis is inherited as an X chromosome-linked recessive trait.
- B. Cystic fibrosis is caused by a defective chloride channel.
- C. Cystic fibrosis is caused by defective acetylcholine receptors.
- D. Cystic fibrosis is inherited as an autosomal dominant trait.

ANSWER: B

143. Which of the following statements regarding retroviruses is/are correct?

- A. The genetic material contained within a retrovirus is DNA.
- B. Inside the host cell the viral RNA is converted to single-stranded DNA.
- C. Proviral DNA is integrated into the host chromosome.
- D. Retroviruses can be used to transfect both replicating and non-replicating cells.

ANSWER: C

144. Which of the following represent obstacles to the use of retroviruses in therapeutic gene transfer?
- A. Viral receptors may not be present on target cell membranes.
  - B. For integration, the host cell must undergo mitosis.
  - C. Viral purification is difficult.
  - D. All the above.

ANSWER: D

145. Which of the following organisms may get reverted to its virulence state?
- A. Heat killed.
  - B. Inactivated.
  - C. Attenuated.
  - D. Both a and b.

ANSWER: C

146. The transgenic animals are those which have
- A. foreign DNA in some of their cells
  - B. foreign DNA in all of their cells
  - C. foreign RNA in all of their cells
  - D. Both (A) and (B)

ANSWER: B

147. Which of the following functional groups is most likely to participate in a dipole-dipole interaction?

- A. Aromatic ring.
- B. Ketone.
- C. Alcohol.
- D. Alkene.

ANSWER: B

148. Which of the following underlined atoms is likely to be the strongest hydrogen bond acceptor?
- A. Amide nitrogen ( $\text{RNHCOR}'$ ).
  - B. Aniline nitrogen ( $\text{ArNH}_2$ ).
  - C. Amine nitrogen ( $\text{RNH}_2$ ).
  - D. Carboxylate oxygen ( $\text{RCO}_2^-$ ).

ANSWER: D

149. Pick out the ODD one out.

- A. Reverse transcriptase.
- B. DNA polymerase.
- C. RNA primer.
- D. Helicase.

ANSWER: A

150. Which of the following underlined protons is likely to be the strongest hydrogen bond donor?
- A. Alcohol ( $\text{ROH}$ ).
  - B. Amine ( $\text{RNH}_2$ ).
  - C. Phenol ( $\text{ArOH}$ ).
  - D. Ammonium ion ( $\text{RNH}_3^+$ ).

ANSWER: D

151. Which of the following statements is true?

- A. Drugs and drug targets generally have similar molecular weights.
- B. Drugs are generally smaller than drug targets.

- C. Drugs are generally larger than drug targets.
- D. There is no general rule regarding the relative size of drugs and their targets.

ANSWER: B

152. What is meant by a binding site?

- A. The area of a macromolecular target that is occupied by a drug when it binds.
- B. The portion of the drug to which a drug target binds.
- C. The functional groups used by a drug in binding to a drug target.
- D. The bonds involved in binding a drug to its target.

ANSWER: A

153. Pick the ODD one out.

- A. p53.
- B. ras.
- C. myc.
- D. Src.

ANSWER: A

154. Which tumor marker is useful for the management of patients with breast cancer?

- A. CA 125.
- B. Inhibin.
- C. CA 19-9.
- D. CA 15-3.

ANSWER: D

155. SCID is due to \_\_\_\_\_ deficiency.

- A. HGPRT.
- B. ADA.
- C. Alkaline phosphatase.
- D. DNA polymerase.

ANSWER: B

156. The virus which is NOT used as vector in gene therapy includes \_\_\_\_\_.

- A. Retrovirus.
- B. Adenovirus.
- C. Herpes virus.
- D. Baculovirus.

ANSWER: D

157. The success on in vivo gene therapy depends on \_\_\_\_\_.

- A. Efficiency of the uptake of the therapeutic gene by the target cell.
- B. Expression capability of the gene
- C. Intracellular degradation of the gene and its uptake by nucleus.
- D. All the above.

ANSWER: D

158. Pick the ODD one out.

- A. Kidney cell.
- B. Sperm.
- C. Ovum.
- D. Zygote.

ANSWER: D

159. Somatic gene therapy involves the usage of \_\_\_\_\_.

- A. Sperm cell.
- B. Egg cell.
- C. Body cell.
- D. Germ cell.

ANSWER: C

160. Germ cell therapy involves the usage of \_\_\_\_\_.

- A. Germ cells.
- B. Liver cell.
- C. Kidney cell.
- D. Fibroblast.

ANSWER: A

161. Which of the following statements describes an ideal tumor marker?

A. The ideal tumor marker should be tumor specific; that is, in the normal population or patients with benign diseases, false-positive test results are rare.

B. The ideal marker must have a low false-negative rate; that means that all patients with a particular type of cancer should test positive.

C. The circulating level of an ideal tumor marker should correlate directly with the amount of viable tumor and be a measure of the response to therapy.

D. All the above

ANSWER: D

162. The problem with the use of modified live vaccines is \_\_\_\_\_.

- A. Toxicity.
- B. Residual virulence.
- C. Encephalitis.
- D. Muscle pain.

ANSWER: B

163. Which is considered the "gold standard" of existing vaccines?

- A. Purified proteins.
- B. Whole-organism.
- C. DNA-based.
- D. Inactivated exotoxins.

ANSWER: B

164. Which among the following organism is suitable for recombinant vaccine production?

- A. Influenza virus.
- B. Poliovirus.
- C. Smallpox.
- D. Vaccinia virus.

ANSWER: D

165. It is difficult to produce a vaccine against AIDS because the HIV \_\_\_\_\_.

- A. Is drug resistance.
- B. Has a reverse transcriptase.
- C. Shows antigenic variation.
- D. Hides within the cell.

ANSWER: C

166. Triple antigen (D.P.T) is for \_\_\_\_\_.

- A. Tetanus, pertussis and diphtheria.
- B. Polio, rabies and hepatitis.

- C. Malaria, typhoid and cancer.
- D. Mixture of virus of tetanus, diphtheria and whooping cough.

ANSWER: A

167. The phenomenon of introduction of foreign gene into the genome to create stable heritable characters is called \_\_\_\_\_.

- A. Transgenesis.
- B. Transformation.
- C. Transfection.
- D. Conjugation.

ANSWER: A

168. The transgenes are introduced into an animal using \_\_\_\_\_.

- A. Retroviral vector.
- B. Microinjection method.
- C. Embryonic stem cell method.
- D. All the above.

ANSWER: D

169. The retroviral vector can effectively carry the genes up to \_\_\_\_\_ kb.

- A. 12.
- B. 8.
- C. 20.
- D. 35.

ANSWER: B

170. Embryonic stem cells are collected from \_\_\_\_\_.

- A. Inner cell mass.
- B. Trophoblast.
- C. Blastocoel.
- D. Gastrocoel.

ANSWER: A

171. The transgene containing cells can be selected using \_\_\_\_\_.

- A. Thymidine kinase.
- B. Thymidine transferase.
- C. Thymidine phosphorylase.
- D. Thymidine hydroxylase.

ANSWER: A

172. The marker commonly used for the selection of the transgene is/are \_\_\_\_\_.

- A. Dihydrofolate reductase.
- B. Neomycin phosphotransferase.
- C. Thymidine kinase.
- D. All the above.

ANSWER: D

173. A nasal spray containing adenovirus carrying a functional human CFTR gene is used to treat cystic fibrosis is an example of which type of gene therapy?

- A. In situ.
- B. In vivo.
- C. Ex vivo.
- D. Vaccine.

ANSWER: B

174. Which tool of recombinant DNA technology is incorrectly paired with its use?
- A. Restriction enzyme: production of RFLPs (Restriction Fragment Length Polymorphism).
  - B. DNA ligase: enzymes that cut DNA, creating sticky ends.
  - C. DNA polymerase: used in PCR to amplify sections of DNA.
  - D. Reverse transcriptase: production of cDNA from mRNA.

ANSWER: B

175. Which of the following seals the sticky ends of restriction fragments to make recombinant DNA?
- A. Reverse transcriptase.
  - B. Restriction enzymes.
  - C. Gel electrophoresis.
  - D. DNA ligase.

ANSWER: D

176. The new tools of genetic engineering allow us to manipulate \_\_\_\_\_ directly.
- A. RNA.
  - B. DNA.
  - C. cell membranes.
  - D. bacteria.

ANSWER: B

177. "Gene library" is a term used to describe \_\_\_\_\_.
- A. A computerized listing of known DNA sequences.
  - B. Bacteria with plasmids containing DNA fragments representing the majority of the genetic information from a plant or animal.
  - C. A collection of books about recombinant DNA technology.
  - D. A compilation of the amino acid sequences of protein coding genes.

ANSWER: B

178. One of the most significant discoveries which allowed the development of recombinant DNA technology was \_\_\_\_\_.
- A. The discovery of antibiotics used for selecting transformed bacteria.
  - B. The identification and isolation of restriction endonucleases permitting specific DNA cutting.
  - C. The discovery of DNA and RNA polymerase allowing workers to synthesize any DNA sequence.
  - D. The development of the polymerase chain reaction.

ANSWER: B

179. RNAs that catalyze biological reactions, such as self-splicing introns, are known as \_\_\_\_\_.
- A. Enzymes.
  - B. Spliceosome.
  - C. Ribozymes.
  - D. Chloroplast.

ANSWER: C

180. Abbreviation for ELISA is \_\_\_\_\_.
- A. Enzyme Linked Immunosolvent Assay
  - B. Enzyme Ligated Immunosorbent Assay
  - C. Enzyme Linked Immunosorbent Assay
  - D. All the above.

ANSWER: C

181. The antibody recognises and binds to the antigenic determinant region of the \_\_\_\_.
- A. Primary antibody.



- B. Antigen.
- C. Enzyme.
- D. Immune cells.

ANSWER: B

182. Which of the following molecules functions to transfer information from the nucleus to the cytoplasm?

- A. DNA.
- B. mRNA.
- C. tRNA.
- D. Proteins.

ANSWER: B

183. AIDS \_\_\_\_\_.

- A. Reduces the number of T-cells.
- B. Is self infectious disease.
- C. Reduces the number of Helper T-cells.
- D. Is the result of incapability of forming interferon.

ANSWER: A

184. Which tumor is commonly observed in AIDS patients?

- A. Melanoma.
- B. Carcinoma.
- C. Kaposi sarcoma.
- D. Burkitts lymphoma.

ANSWER: C

185. The drug that is used to treat AIDS patients is \_\_\_\_\_.

- A. Azidothymidine.
- B. Tetracycline.
- C. Cortisone.
- D. Cyclosporine.

ANSWER: A

186. The mechanical disaggregation of the tissue involves \_\_\_\_\_.

- A. Chopping.
- B. Sieving.
- C. Pipetting.
- D. All the above.

ANSWER: D

187. The finite cell lines normally divide \_\_\_\_\_ doubling.

- A. 20-100.
- B. 75-150.
- C. 100-175.
- D. 200-250.

ANSWER: A

188. Pick the ODD one out.

- A. Transformed cell line.
- B. Immortal cell line.
- C. Tumorigenic cell line.
- D. Finite cell line.

ANSWER: D

189. The cell culture can be maintained by checking the \_\_\_\_\_.

- A. Cell concentration.
- B. Decrease in pH.
- C. Morphological changes.
- D. All the above.

ANSWER: D

190. The DNA microarrays technology that indicates which genes are transcribed is called \_\_\_\_\_.

- A. DNA variation screening.
- B. Gene expression profiling.
- C. Microarray comparative genomic hybridization.
- D. Antisense.

ANSWER: B

191. Swapping an inactivated allele for a gene of interest produces a \_\_\_\_ mouse.

- A. Knock out.
- B. Gene targeted
- C. Knock in.
- D. Transgenic.

ANSWER: A

192. The first patent for a transgenic organism was awarded in 1988. Which organism was patented?

- A. Yeast used in industrial processes.
- B. A bacterium able to metabolize components of crude oil.
- C. A mouse that manufactures human protein in its milk.
- D. Life forms cannot be patented.

ANSWER: C

193. Which gene transfer technique involves a tiny needle which is used to inject DNA into a cell lacking that DNA sequence?

- A. Electroporation.
- B. Liposome transfer.
- C. Microinjection.
- D. Particle bombardment.

ANSWER: C

194. The DNA microarrays technology that tracks deletions and amplifications of specific DNA sequences is called \_\_\_\_\_.

- A. DNA variation screening.
- B. Gene expression profiling.
- C. Microarray comparative genomic hybridization.
- D. Antisense.

ANSWER: C

195. A microarray is a \_\_\_\_\_.

- A. Ray of a small wavelength.
- B. A type of ultraviolet ray.
- C. An RNA probe used to identify viruses.
- D. An arrangement of oligonucleotide probes, closely arranged on a small solid support surface.

ANSWER: D

196. Which one of the following is the quickest method for measuring serum immunoglobulin levels

accurately?

- A. Immuno-electrophoresis.
- B. Nephelometry.
- C. Radioimmunoassay.
- D. Radial immunodiffusion.

ANSWER: B

197. Which one of the following statements is correct regarding the innate immune system?

- A. It is specific.
- B. It evokes a more potent response on secondary exposure.
- C. It represents the first line of defense.
- D. It is able to memorise pathogens on subsequent exposures.

ANSWER: C

198. \_\_\_\_\_ is a biochemical technique used mainly in immunology to detect the presence of an antibody or an antigen in a sample.

- A. Immuno-electrophoresis.
- B. Chromatography.
- C. ELISA.
- D. Radial immunodiffusion.

ANSWER: C

199. Tumor enhancement is \_\_\_\_\_.

- A. Promotion of tumor growth by Ab.
- B. Promotion of tumor growth by drugs.
- C. Promotion of tumor growth by NK-cells.
- D. Inhibition of tumor growth by Ab.

ANSWER: A

200. Carcinoembryonic antigen is characteristically secreted by tumors of the \_\_\_\_\_.

- A. Kidney.
- B. Lungs.
- C. Bones.
- D. GI tract.

ANSWER: D

201. Chagas disease is caused by \_\_\_\_\_.

- A. Yersinia pestis.
- B. Trypanosoma cruzi.
- C. Trypanosoma gombiense.
- D. Borrelia recurrentis.

ANSWER: B

202. \_\_\_\_\_ demonstrates the parasite whole cell or of parasites nucleic acid or products present in the blood.

- A. Direct diagnosis.
- B. Indirect diagnosis.
- C. ELISA.
- D. Western Blotting.

ANSWER: A

203. The production of \_\_\_\_\_ antigen by blood stages of Plasmodium falciparum forms the basis for the development of ELISA antigen test.

- A. BRCA.

- B. Alkaline protease.
- C. Creatinine kinase.
- D. Histidine rich protein II (HRP-II)

ANSWER: D

204. \_\_\_\_\_ are hemoflagellates protozoan belonging to Zoomastigophora i.e. Move by flagella and divide by longitudinal fission.

- A. Blood flagellates.
- B. Blood sorozoans.
- C. Water protozoans.
- D. All the above.

ANSWER: A

205. The host cell used for the production of erythropoietin \_\_\_\_\_.

- A. E.Coli.
- B. Yeast.
- C. CHO cell lines.
- D. BHK cell lines.

ANSWER: C

206. Chagas disease is otherwise called as \_\_\_\_\_.

- A. American trypanosomiasis.
- B. African trypanosomiasis.
- C. Sleeping sickness
- D. All the above.

ANSWER: A

207. \_\_\_\_\_ disease in which a female Anopheles mosquito (the definitive host) transmits a motile infective form (called the sporozoite) to a vertebrate host such as a human (the secondary host).

- A. AIDS.
- B. Cancer.
- C. Diabetes.
- D. Malaria.

ANSWER: D

208. Of the following which is NOT the trade name of HBSAg vaccine?

- A. Engerix B.
- B. Twinrix.
- C. Tritanrix.
- D. Procrit.

ANSWER: D

209. \_\_\_\_\_ is a tropical parasitic disease transmitted to humans and other mammals by an insect vector called Triatoma infestans.

- A. Lyme disease.
- B. Malaria
- C. Periodontal disease.
- D. Chagas disease.

ANSWER: D

210. \_\_\_\_\_ is a type of disease that affects one or more of the periodontal tissues.

- A. Malaria.
- B. Chagas disease.
- C. Periodontal disease.

D. All the above.

ANSWER: C

211. \_\_\_\_\_ is the application of statistics and computer science to the field of molecular biology.

- A. Bioinformatics.
- B. Biochemistry.
- C. Molecular Biology.
- D. Immunology.

ANSWER: A

212. Luciferase reporter phage is used in the diagnosis of \_\_\_\_\_.

- A. Malaria.
- B. Chagas disease.
- C. Sickle cell anemia.
- D. Tuberculosis

ANSWER: D

213. Virapep detection kit is used for the detection of \_\_\_\_\_.

- A. HIV.
- B. HPV.
- C. Borrelia burgdorferi.
- D. None of the above.

ANSWER: B

214. Sickle cell anemia occurs due to replacement of \_\_\_\_\_.

- A. Glu by Val.
- B. Val by Glu.
- C. Val by Asp.
- D. Glu by Ala.

ANSWER: A

215. \_\_\_\_\_ is a DNA sequence variation occurring when a single nucleotide in the genome (or other shared sequence) differs between members of a species.

- A. RFLPs.
- B. VNTRs.
- C. STRs.
- D. SNPs.

ANSWER: D

216. Pick out the natural biodegradable polymer used in tissue engineering.

- A. Glycosaminoglycans.
- B. Polyglycolide.
- C. Pylactide.
- D. Ployglyconate.

ANSWER: A

217. The first use of amniotic fluid examination in the diagnosis of genetic diseases was reported by \_\_\_\_\_.

- A. John Edward.
- B. Nadler.
- C. Fuchs and Riis.
- D. Gerbie.

ANSWER: C

218. \_\_\_\_\_ is a dimer made of 2 monomers occurs in the tissues.

- A. Creatine kinase.
- B. Alkaline phosphatase.
- C. Lactose dehydrogenase.
- D. Both a and b.

ANSWER: A

219. \_\_\_\_\_ is required for conversion of creatine into creatine phosphate.

- A. Alkaline phosphatase.
- B. Lactose dehydrogenase.
- C. Creatine kinase.
- D. Both a and b.

ANSWER: C

220. \_\_\_\_\_ is the transplantation of living cells, tissues or organs from one species to another.

- A. Transplantation.
- B. Xenotransplantation.
- C. Transcription.
- D. Tranfusion.

ANSWER: B

221. There are 3 possible sources of stem cells to be used in transplantation \_\_\_\_\_.

- A. Liver, blood and heart.
- B. Heart, lungs and spleen
- C. Kidney, liver and spleen.
- D. Bone marrow, the bloodstream (peripheral blood), and umbilical cord blood.

ANSWER: D

222. \_\_\_\_\_ is an intervention strategy that introduces new adult stem cells into damaged tissue in order to treat disease or injury.

- A. Gene therapy.
- B. Recombinant DNA Technology.
- C. Stem cell therapy.
- D. Xenotransplantation

ANSWER: D

223. \_\_\_\_\_ is the use of DNA as a pharmaceutical agent to treat disease.

- A. Gene therapy.
- B. Recombinant DNA Technology.
- C. Stem cell therapy
- D. Xenotransplantation.

ANSWER: A

224. \_\_\_\_\_ is often approached via a drug's chemical formulation, but it may also involve medical devices or drug-device combination products.

- A. Drug design.
- B. Drug invasion.
- C. Drug delivery.
- D. All the above.

ANSWER: C

225. A \_\_\_\_\_ is a key molecule involved in a particular metabolic or signaling pathway that is specific to a disease condition or pathology.

- A. Microbe.

- B. Drug target.
- C. Toxin.
- D. Metabolic protein

ANSWER: B

226. Which technology would allow men with spinal cord injuries to become fathers?

- A. IVF D)
- B. GIFT
- C. ICSI
- D. ZIFT

ANSWER: C

227. What makes stem cells different from other cells in the body?

- A. Stem cells are larger in size
- B. Stem cells are unspecialized cells.
- C. Stem cells have unique morphology.
- D. Stem cells are thick.

ANSWER: B

228. The process of an unspecialized stem cells becoming specialized cells is called \_\_\_\_\_.

- A. Differentiation.
- B. De-differentiation.
- C. Elongation.
- D. Speciation.

ANSWER: A

229. Plasticity of stem cell is the property in which the \_\_\_\_\_.

- A. Cells become thick and hard over the time.
- B. Cells remain quiescent.
- C. Cells from one area would become cells related to a different area.
- D. Cells acquire elasticity.

ANSWER: C

230. Cell based therapies using stem cells helps in \_\_\_\_\_.

- A. Replacement of tissue and organs.
- B. Understanding signals that causes cell differentiation.
- C. Understanding growth of the cell.
- D. Medication of viral infection.

ANSWER: A

231. The process by which developing cells achieve their functional, mature identity as liver, or muscle, or nerve is called \_\_\_\_\_.

- A. Cleavage division.
- B. Pattern formation.
- C. Morphogenesis.
- D. Differentiation.

ANSWER: D

232. An abnormally shaped uterus leads to

- A. infertility
- B. spontaneous abortion
- C. both a and b
- D. unknown association.

ANSWER: B

233. Embryonic stem cells are pluripotent which means that it \_\_\_\_\_.

- A. Can be differentiated into any cell type.
- B. Can give rise to placenta.
- C. Can give rise to extra embryonic tissue.
- D. Can give rise to the whole organism.

ANSWER: A

234. Stem cell can \_\_\_\_\_.

- A. Self renew.
- B. Give rise to any cell type.
- C. Give rise to only one cell type.
- D. Both a and b.

ANSWER: C

235. Chimeraplasty attempts to

- A. replace one normal allele with a different normal allele
- B. replace an abnormal gene.
- C. repair an abnormal gene in place.
- D. remove an abnormal gene.

ANSWER: C

236. \_\_\_\_\_ is a process by which an egg is fertilised by sperm outside the body

- A. In vitro fertilisation (IVF)
- B. Intrauterine insemination (IUI).
- C. Intracytoplasmic sperm injection (ICSI).
- D. zygote intrafallopian transfer (ZIFT).

ANSWER: A

237. Louise Brown, the first test-tube baby, was conceived using which assisted reproductive technology?

- A. Artificial insemination.
- B. Intracytoplasmic sperm injection.
- C. In vitro fertilization.
- D. Gamete intrafallopian transfer.

ANSWER: C

238. An underactive thyroid can lead to

- A. ovulation problems.
- B. blocked fallopian tubes.
- C. antisperm secretions.
- D. endometriosis.

ANSWER: A

239. Men who have \_\_\_\_\_ lack sperm.

- A. ICSI.
- B. oligospermia.
- C. azoospermia.
- D. spermia.

ANSWER: C

240. Which assisted reproductive technology has been used for the longest time period?

- A. Artificial insemination.
- B. Intracytoplasmic sperm injection.



- C. In vitro fertilization.
- D. Gamete intrafallopian transfer.

ANSWER: A

241. Differentiation potential of stem cells specifies

- A. self renewal
- B. stochastic differentiation
- C. asymmetric replication
- D. potency

ANSWER: D

242. The basis for development of leukemia in some children treated with a retrovirus-derived gene therapy vector is \_\_\_\_\_.

- A. Insertion of the viral genome adjacent to an oncogene.
- B. Use of a virus that contains an oncogene
- C. Insertional mutation of a tumor suppressor gene.
- D. Stimulation of immune response to cell surface antigens introduced by an inserted gene.

ANSWER: A

243. In gene therapy, in order to be successful, the healthy gene inserted into a target cell must \_\_\_\_\_.

- A. Take over and kill the defective gene.
- B. Be inserted manually into the cell's mitochondria.
- C. Become attached to the cell's mrna molecules.
- D. Be able to make the correct amount of the protein needed.

ANSWER: D

244. Which assisted reproductive technology places collected oocytes and sperm in the woman's fallopian tubes?

- A. artificial insemination
- B. intracytoplasmic sperm injection
- C. in vitro fertilization
- D. gamete intrafallopian transfer

ANSWER: D

245. What is the main objective of a phase I clinical gene therapy trial?

- A. Assessment of the safety of the gene therapy product
- B. Evaluate the optimal doses of the gene therapy product.
- C. Provide scientific proof of successful treatment.
- D. Provide pre-clinical safety data for clinical studies.

ANSWER: A

246. Which of the following viral vectors are most often used in clinical gene therapy trials?

- A. Lentiviral vectors.
- B. Vaccinia vectors.
- C. Adeno-associated viral vectors.
- D. Adenoviral vectors.

ANSWER: D

247. Which of the following is an example of a condition caused by a mutation in a single gene?

- A. Colon cancer.
- B. Heart disease.
- C. AIDS.
- D. Cystic fibrosis.

ANSWER: D

248. Gene therapy targeting the germ-line is \_\_\_\_\_.

- A. Heritable.
- B. Not heritable.
- C. Sometimes heritable.
- D. Unrelated to heritability.

ANSWER: A

249. Which deficiency of the immune system was the first disorder researchers treated with gene therapy?

- A. Adenosine deaminase deficiency (ADA).
- B. Ornithine transcarbamylase (OTC).
- C. Duchenne muscular dystrophy (DMD).
- D. Sickle Cell Anemia (SCA).

ANSWER: A

250. Which part of the human body are bone marrow cells removed from to perform ex vivo SCID gene therapy?

- A. Lung.
- B. Skull.
- C. Hip bone.
- D. Spinal cord.

ANSWER: C

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