



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: rDNA TECHNOLOGY - 358A

Multiple Choice Questions.

1. GEAC stands for _____.

- A. Genetic Engineering Approval Committee.
- B. Genetic Engineering Action Committee.
- C. Genetic Engineering Action Council.
- D. Genetic Engineering Approval Council.

ANSWER: A

2. DNA fragments are _____ charged and hence move _____ the anode.

- A. positively, towards.
- B. negatively, towards.
- C. positively, against.
- D. negatively, against.

ANSWER: B

3. The cell wall of bacterium is digested by _____.

- A. Protease.
- B. Chitinase.
- C. Lysozyme.
- D. Amylase.

ANSWER: C

4. The application of genetic engineering in producing therapeutic products is called _____

- A. Pharmacology.
- B. Molecular farming.
- C. Molecular pharming.
- D. Pharmaco engineering.

ANSWER: C

5. Cloning is highly possible in _____.

- A. bacteria.
- B. virus.
- C. fungi.
- D. algae.

ANSWER: A

6. The cofactor for the enzyme Taq polymerase is _____.

- A. Mg²⁺.
- B. Mn²⁺.
- C. Zn²⁺.
- D. Ca²⁺.

ANSWER: A

7. The first recombinant protein to be produced is _____.

- A. interleukins.

- B. humulin.
- C. erythropoietin.
- D. factor VIII.

ANSWER: B

8. The Gene formed by joining of DNA segments from two different source is called as
- A. recombination Gene
 - B. Chimaeric Gene
 - C. Mutant Gene
 - D. Lethal Gene

ANSWER: B

9. What type of treatment is carried out in transformation of E.coli?
- A. MgCl₂ treatment.
 - B. NaCl treatment.
 - C. AgCl₂ treatment.
 - D. CaCl₂ treatment.

ANSWER: D

10. The RP13 gene of chromosome 17 codes for a protein _____ .
- A. involved in glucose transport
 - B. that is a component of hair and nails
 - C. involved in eye development
 - D. involved in the determination of personality

ANSWER: C

11. The process of determining precise order of nucleotides within DNA is
- A. DNA Replication
 - B. DNA modification
 - C. DNA Conjugation
 - D. DNA sequencing

ANSWER: D

12. The role of pili in cloning of bacteria in E.coli is _____.
- A. conjugation.
 - B. transformation.
 - C. tranfection.
 - D. transduction.

ANSWER: A

13. The shuttle vectors are available in cloning of E.coli with _____
- A. yeast.
 - B. Bacillus sp.
 - C. mammalian cell.
 - D. all the above.

ANSWER: D

14. Genomic library is made up of ?
- A. Alpha Phage Vectors
 - B. Beta Phage Vectors
 - C. Lambda Phage Vectors
 - D. Gamma Phage Vectors

ANSWER: C

15. The first cloned rat in the world is called as _____.
- A. Ralph.
 - B. Prometea.
 - C. Snuppy.

D. Dolly.

ANSWER: A

16. The most important discovery made a remarkable change in rDNA technology is

- A. discovery of plasmids
- B. discovery of PCR
- C. discovery of enzymes
- D. discovery of AGE

ANSWER: A

17. What is the genome size of E.coli?

- A. 2.6 Mb.
- B. 4.6 Mb.
- C. 6.6 Mb.
- D. 8.6 Mb.

ANSWER: B

18. Transcription occurs in _____

- A. cytosol.
- B. nucleus.
- C. nucleolus.
- D. mitochondria.

ANSWER: C

19. Which of these genes codes for a protein that plays a role in white blood cell function?

- A. DCP1
- B. MPO
- C. GLUT4
- D. RP13

ANSWER: B

20. The Polymerase Chain Reaction is a technique that _____.

- A. is used to demonstrate DNA as the genetic material.
- B. is used to determine the content of minerals in a soil sample.
- C. uses short DNA primers and a thermostable DNA polymerase to replicate specific DNA sequences in vitro.
- D. increases the ribosome transfer rate during translation.

ANSWER: C

21. RFLP analysis is a technique that _____.

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

ANSWER: A

22. Zinc finger proteins and helix-turn-helix proteins are _____.

- A. types of DNA-binding proteins.
- B. involved in the control of translation.
- C. components of ribosomes.
- D. part of the hemoglobin in blood cells.

ANSWER: A

23. Replication of DNA occurs in a _____ manner.

- A. conservative.
- B. dispersive.
- C. semi-conservative.
- D. a & b.

ANSWER: C

24. DNA ligase is an enzyme _____.
- A. that joins fragments in normal DNA replication.
 - B. involved in protein synthesis.
 - C. of bacterial origin which cuts DNA at defined base sequences.
 - D. that facilitates transcription of specific genes.

ANSWER: A

25. Choose the CORRECT statement about the genetic code
- A. Includes 61 codon for amino acids and 3 stop codon.
 - B. Almost universal; exactly the same in most genetic systems.
 - C. Three bases per codon.
 - D. All the above.

ANSWER: D

26. Which component of transcribed RNA in eukaryotes is present in the initial transcript but is removed before translation occurs?

- A. Intron.
- B. 3- Poly A tail.
- C. Ribosome binding site.
- D. 5- cap.

ANSWER: A

27. Where the genes are located?

- A. Nucleus.
- B. Ribosomes.
- C. Endoplasmic reticulum.
- D. Golgi complex.

ANSWER: A

28. Gene that masks the effect of another gene is said to be _____.

- A. dominant.
- B. recessive.
- C. selectable.
- D. reporter.

ANSWER: A

29. Who discovered restriction enzyme

- A. Thomas .K
- B. Paul Berg
- C. G.J.Mendel
- D. Watson and Crick

ANSWER: B

30. Polymerase chain reaction was developed so that scientists could _____.

- A. compare the DNA fingerprints of different people.
- B. create corn plants that product the Bt toxin.
- C. replicate a gene without using bacteria.
- D. choose organisms with desired characteristics for breeding

ANSWER: C

31. During the RNA isolation procedure, nuclear and cytoplasmic fractions were treated with phenol/chloroform in order to precipitate _____.

- A. DNA.
- B. RNA.
- C. proteins.
- D. b and c

ANSWER: C

32. Absolute ethanol is used in RNA isolation to _____.

- A. precipitate DNA.
- B. precipitate RNA.
- C. precipitate proteins.
- D. dissolve RNA.

ANSWER: B

33. The cloning of any DNA fragment essentially involves _____ steps.

- A. Introduction of recombinant DNA into the host organism.
- B. Selection of organisms containing recombinant DNA.
- C. Screening for clones with desired DNA inserts and biological properties.
- D. all the above.

ANSWER: D

34. Who created the shuttle vectors of pC194 and pT127?

- A. Boyer.
- B. Cohen.
- C. Ehrlich.
- D. Pock.

ANSWER: C

35. thy- gene of Bacillus are highly resistant to _____.

- A. tri methoprim.
- B. tetra methoprim.
- C. penta methoprim.
- D. mono methoprim.

ANSWER: A

36. The agarose gel used for the Northern blotting procedure contained formaldehyde. What is its significance?

- A. To denature proteins.
- B. To keep RNAs in their native form during electrophoresis.
- C. To make RNAs denatured during electrophoresis.
- D. To make RNAs positively charged.

ANSWER: B

37. The proteins separated in SDS PAGE will carry _____ charge

- A. positive.
- B. neutral.
- C. negative.
- D. no.

ANSWER: C

38. SDS used in PAGE will impart _____ charge to the protein

- A. positive.
- B. negative.
- C. neutral.
- D. a & b.

ANSWER: B

39. DNA is separated on agarose based on its _____.

- A. length.
- B. charge.
- C. molecular weight.
- D. a & b.

ANSWER: C

40. On increasing the agarose concentration pore size will _____.

- A. decrease.
- B. increase.
- C. remain the same.
- D. not be affected.

ANSWER: A

41. Agarose used in electrophoresis is obtained from _____

- A. fungi.
- B. bacteria.
- C. sea weed.
- D. actinomycetes.

ANSWER: C

42. The recognition site of EcoRI is _____.

- A. GAATTC.
- B. GGGCCC.
- C. GCGCTA.
- D. ATCGTA.

ANSWER: A

43. Which of the following produces blunt end?

- A. Eco RI.
- B. Sma I.
- C. Hind III.
- D. Bam HI.

ANSWER: B

44. Which of the following enzyme recognizes 8bp sequence?

- A. Sac I.
- B. Sau3 AI.
- C. Not I.
- D. Eco RI.

ANSWER: C

45. 6bp recognition site is expected to occur once in every _____ bp.

- A. 4096.
- B. 1096.
- C. 256.
- D. 3092.

ANSWER: A

46. 4bp recognition site is expected to occur once in every _____ bp

- A. 4096.
- B. 256.
- C. 426.
- D. 512.

ANSWER: B

47. The recognition site of Sau3AI is _____.

- A. GATC.
- B. GAATTC.
- C. GANTC.
- D. GGATCC.

ANSWER: A

48. Which type of RNA has a greater affinity in *Bacillus subtilis* than *E.coli*?

- A. 16S RNA.
- B. 23S RNA.
- C. 5S RNA.
- D. 28S RNA.

ANSWER: A

49. Pick the ODD one out.

- A. Luciferase.
- B. CAT.
- C. Alkaline phosphatase.
- D. GFP.

ANSWER: C

50. Operator sequences of E.coli lac operon acts as a/an _____.

- A. inducer.
- B. repressor.
- C. expresser.
- D. inhibitor.

ANSWER: A

51. If lacZ gene is inactivated due the insertion of foreign gene, the colonies appear will be in _____ color.

- A. blue.
- B. white.
- C. yellow.
- D. purple.

ANSWER: B

52. Pick out the isoschizomers

- A. Sac I & Sst I.
- B. Bam HI & Not I.
- C. Sau3 AI & Sac I.
- D. Bam HI & Sst I.

ANSWER: A

53. GANTC is the recognition site of _____.

- A. XhoII.
- B. BamHI.
- C. SstI.
- D. HinfI.

ANSWER: D

54. Which of the following tag is used to purify proteins in affinity chromatography?

- A. Histidine.
- B. Valine.
- C. Alanine.
- D. Cystine.

ANSWER: A

55. Plant cells without cell wall are called as _____.

- A. cytoplasm.
- B. protoplast.
- C. chromoplast.
- D. chloroplast.

ANSWER: B

56. Plasmid DNA and genomic DNA differ in density can be separated by _____.

- A. enzymatic digestion.
- B. EtBr Caesium chloride density gradients.

- C. PEG separation methods.
- D. chromatographic methods.

ANSWER: B

57. To Concentrate and remove caesium chloride from DNA, dialysis is done against _____ buffer.

- A. TE.
- B. PBS.
- C. TBE.
- D. phosphate.

ANSWER: A

58. Which of the following restriction enzyme recognizes the methylated sequences?

- A. Type I.
- B. Type II.
- C. Type III.
- D. Type IV.

ANSWER: D

59. Quantification of nucleic acids can be carried out by _____.

- A. caesium chloride gradients.
- B. spectrophotometric methods.
- C. chromatographic methods.
- D. alkaline lysis method.

ANSWER: B

60. Quantification of DNA is done at _____ nm.

- A. 260.
- B. 290.
- C. 280.
- D. 220.

ANSWER: A

61. Pick out the ODD one out.

- A. pBR322.
- B. HAC.
- C. MAC.
- D. YAC.

ANSWER: A

62. Capacity of YAC is _____ kb.

- A. 200.
- B. up to 2000.
- C. 300.
- D. 100.

ANSWER: B

63. Pick the ODD one out.

- A. E.coli.
- B. Bacillus sp.
- C. Yeast.
- D. Staphylococcus aureus.

ANSWER: C

64. Vector with replication origin sequence from two different organisms is called _____ vector.

- A. expression.
- B. replacement.
- C. insertion.
- D. shuttle.

ANSWER: D

65. Nucleic acids concentration can be quantitated in terms of _____.

- A. microgram/ml.
- B. microgram/microl.
- C. mg/ml.
- D. mg/microl.

ANSWER: A

66. Purity of nucleic acids can be checked by measuring OD at _____ nm & _____ nm.

- A. 260,280.
- B. 265,285.
- C. 260,285.
- D. 265,280.

ANSWER: A

67. At which degrees plasmid DNA can be stored for couple of days?

- A. 5.
- B. 4.
- C. 3.
- D. 8.

ANSWER: B

68. The plasmid DNA can be stored for couple of days by adding _____.

- A. ethanol.
- B. iso amyl alcohol.
- C. isopropanol.
- D. ice cold ethanol.

ANSWER: C

69. The most commonly used methods for quantifying the nucleic acid is/are _____.

- A. gel electrophoresis.
- B. spectrophotometry.
- C. chromatography.
- D. all the above.

ANSWER: D

70. Which of the following is NOT an amino acid?

- A. Glutamic acid.
- B. Aspartic acid.
- C. Glutamine.
- D. Palmitic acid.

ANSWER: D

71. What type of covalent bonds link the amino acids in a protein?

- A. Peptide bonds.
- B. Hydrogen bonds.
- C. Ionic bonds.
- D. Glycosidic bonds.

ANSWER: A

72. Which of the following is found in proteins?

- A. Adenosine.
- B. Adenine.
- C. Alanine.
- D. Linoleic acid.

ANSWER: C

73. Sangers method of DNA sequencing can also be called as _____.

- A. chain termination method.
- B. chain elongation method.
- C. chemical synthesis.
- D. pyrolysis.

ANSWER: A

74. Prosthetic groups are _____.

- A. required by all enzymes in the cell.
- B. loosely bound to enzymes via hydrogen bonds.
- C. linked to phosphate groups.
- D. tightly bound to enzymes and are required for their activity.

ANSWER: D

75. Which genes product acts as anti-terminator in lambda phage?

- A. cI.
- B. cII.
- C. cIII.
- D. N.

ANSWER: D

76. Most commonly used enzyme for the construction of gene libraries is _____.

- A. Bam HI.
- B. Hind II.
- C. Hind I.
- D. Bal II.

ANSWER: A

77. Pick out the ODD one out.

- A. DNases.
- B. RNases.
- C. Restriction endonucleases.
- D. Ligases.

ANSWER: D

78. Name the worlds first cloned dog.

- A. Ralph.
- B. Prometea.
- C. Snuppy.
- D. Dolly.

ANSWER: C

79. Transformation is possible in Streptomyces in the presence of _____.

- A. SDS.
- B. PEG.
- C. DMSO.
- D. CTAB.

ANSWER: B

80. Restriction enzymes are otherwise called as

- A. Biological blades
- B. Biological scissors
- C. Molecular knives
- D. molecular scalpels

ANSWER: B

81. Direct uptake of DNA is _____.

- A. transformation.

- B. transfection.
- C. transduction.
- D. conjugation.

ANSWER: A

82. Lysozyme treatment is done to _____.

- A. weaken the cell wall.
- B. weaken the cell membrane.
- C. improve RNA uptake.
- D. improve mRNA uptake.

ANSWER: A

83. Positive selection vectors are called as _____ vectors.

- A. specialist.
- B. expression.
- C. insertion.
- D. shuttle.

ANSWER: A

84. Type II restriction endonucleases requires _____.

- A. ATP.
- B. magnesium ions.
- C. SAM.
- D. GTP.

ANSWER: B

85. The first report of cloned Streptomyces gene is from the laboratory of _____.

- A. Cohen.
- B. Boyer.
- C. Boyer and Cohen.
- D. Ehlirch.

ANSWER: A

86. Most commonly studied species of Streptomyces is _____.

- A. Streptomyces griseus.
- B. Streptomyces coelicolor.
- C. Streptomyces aurofaciens.
- D. Streptomyces ramosus.

ANSWER: B

87. The vector which is used to express gene of interest is a/an _____ vector.

- A. expression.
- B. replacement.
- C. insertion.
- D. shuttle.

ANSWER: A

88. The DNA molecule to which the gene of insert is integrated for cloning is called

- A. transformer
- B. carrier
- C. vector
- D. conductor

ANSWER: C

89. Pick out the ODD one.

- A. Mitochondria.
- B. Chloroplast.
- C. Bacteria.

D. Mammalian cell.

ANSWER: D

90. A selectable marker that is highly employed in *Bacillus* sp is _____.

- A. ampicillin resistance.
- B. tetracycline resistance.
- C. erythromycin resistance.
- D. chloramphenicol resistance.

ANSWER: A

91. Self-transmissible plasmids are identified in _____.

- A. Gram positive bacteria.
- B. Gram negative bacteria.
- C. viruses.
- D. phages.

ANSWER: A

92. The first shuttle vector constructed was shuttling between _____ & _____.

- A. *E.coli*, *S.aureus*.
- B. *E.coli*, *Bacillus amyloliquefaciens*.
- C. *S.aureus*, *Bacillus subtilis*.
- D. *E.coli*, *Bacillus subtilis*.

ANSWER: D

93. The transfer of genetic information by the formation of sex pili is _____.

- A. transformation.
- B. transduction.
- C. conjugation.
- D. transfection.

ANSWER: C

94. The first organism used in the DNA technology by many scientists is _____.

- A. *Bacillus* sp.
- B. *E.coli*.
- C. yeast.
- D. phages.

ANSWER: B

95. The first successful recombinant plasmid was constructed by Boyer and Cohen in _____.

- A. 1973.
- B. 1993.
- C. 1983.
- D. 1963.

ANSWER: A

96. In which PCR, primers in different proportions are used?

- A. Nested.
- B. Assymmetric.
- C. Anchored.
- D. Real Time.

ANSWER: B

97. Marker gene present in *Streptomyces* is _____.

- A. penicillinase.
- B. ampicillin resistance gene.
- C. thymidine synthesis gene.
- D. tyrosinase gene.

ANSWER: D

98. The virus used to fuse cells is _____.

- A. HIV.
- B. HPV.
- C. Sendai.
- D. HSV.

ANSWER: C

99. Dam methylase methylates _____.

- A. adenine.
- B. guanine.
- C. cytosine.
- D. thymine.

ANSWER: A

100. Vectors with selectable markers are used to identify _____.

- A. recombinant clones.
- B. desired genes.
- C. vector DNA fragments.
- D. foreign genes.

ANSWER: A

101. The plasmids may carry genes for special functions that include _____.

- A. toxin producing genes.
- B. tumour inducing genes.
- C. both a and b.
- D. b alone

ANSWER: C

102. Numbers of chromosomes in diploid yeast cell are _____.

- A. 32.
- B. 30.
- C. 16.
- D. 46.

ANSWER: A

103. Who first transformed yeast with DNA using CaCl₂-PEG method?

- A. Hinnen, 1978.
- B. Ehlirch, 1978.
- C. Boyer, 1978.
- D. Cohen, 1978.

ANSWER: A

104. The first eukaryote to be used for cloning is _____.

- A. Paramecium.
- B. Euglena.
- C. Chlamydomonas.
- D. Saccharomyces.

ANSWER: D

105. Most commonly used yeast selectable marker is _____.

- A. Ura 3.
- B. Trp 1.
- C. Leu 2.
- D. His 3.

ANSWER: A

106. Who first constructed Yeast episomal plasmid?

- A. Hinnen, 1978.
- B. Ehlirch, 1978.
- C. Beggs, 1978.
- D. Clarke, 1978.

ANSWER: C

107. Yeast plasmid also called as _____ plasmid.

- A. 2 microm.
- B. 4 microm.
- C. 6 microm.
- D. 8 microm.

ANSWER: A

108. DCM methylase methylates _____.

- A. adenine.
- B. guanine.
- C. cytosine.
- D. thymine.

ANSWER: C

109. ARS sequences are seen only in _____.

- A. YEps.
- B. YRps.
- C. YCps.
- D. YIps.

ANSWER: B

110. Who first constructed Yeast centromere plasmid?

- A. Hinnen, 1980.
- B. Ehlirch, 1980.
- C. Beggs, 1980.
- D. Clarke and Carbon, 1980.

ANSWER: D

111. The term antibiotic was coined by _____.

- A. Alexander Fleming.
- B. S. Waksman.
- C. Louis Pasteur.
- D. Edward Jenner.

ANSWER: A

112. The antibiotic Tetramycin is obtained from _____.

- A. Streptomyces griseus.
- B. Streptomyces ramosus.
- C. Streptomyces venezuelae.
- D. Clostridium botulinum.

ANSWER: B

113. Which one of the following is NOT true about antibiotics?

- A. First antibiotic was discovered by Alexander Fleming.
- B. The term 'antibiotic' was coined by S. Waksman in 1942.
- C. Some persons can be allergic to a particular antibiotic.
- D. Each antibiotic is effective only against one particular kind of germ.

ANSWER: B

114. Which microorganism produces streptomycin?

- A. Streptomyces griseus.
- B. Streptomyces ramosus.

C. Streptomyces antibiotics.

D. Streptomyces nodosus.

ANSWER: A

115. Antibiotics are mostly obtained from _____.

A. fungi .

B. actinomycetes.

C. cyanobacteria.

D. a and b.

ANSWER: D

116. Penicillin is obtained from _____.

A. Aspergillus fumigatus.

B. Penicillium chrysogenum.

C. Penicillium griseofulvum.

D. Streptomyces griseus.

ANSWER: B

117. Who developed yeast artificial chromosomes?

A. Boyer and Cohen.

B. Szostak and Blackburn.

C. Beggs.

D. Clarke and Carbon.

ANSWER: B

118. M13 phage contains _____.

A. ss DNA.

B. ds DNA.

C. ss RNA.

D. ds RNA.

ANSWER: A

119. MCS stands for _____.

A. Multiple Cloning Sequence

B. Multiple Cloning Segment.

C. Multiple Cloning Site.

D. Methylated Cloning Site.

ANSWER: C

120. A virus with Cos site is _____.

A. lambda phage.

B. M13 phage.

C. plasmid.

D. cosmids.

ANSWER: A

121. SS extensions of lambda phages consists of _____ nucleotides.

A. 12.

B. 24.

C. 46.

D. 56.

ANSWER: A

122. Genetic map of lambda phages depicts _____ genes.

A. 48.

B. 27.

C. 37.

D. 17.

ANSWER: C

123. The essential features of plasmids include _____.

- A. Replication origin.
- B. Selectable markers.
- C. MCS.
- D. All the above.

ANSWER: D

124. Widely used viral promoters in vectors are _____.

- A. T7.
- B. SP6.
- C. T5.
- D. a and b.

ANSWER: D

125. 2microm plasmid is present in _____.

- A. yeast.
- B. lambda phages.
- C. M 13 phages.
- D. viruses.

ANSWER: A

126. How many groups are present in plasmid incompatibility?

- A. 10.
- B. 20.
- C. 30.
- D. 40.

ANSWER: C

127. Plasmids incompatibility sequence determines the plasmid _____.

- A. copy number.
- B. length.
- C. diameter.
- D. MCS regions.

ANSWER: A

128. Which of the following virus has ssRNA as the genome?

- A. Retroviruses.
- B. Adenovirus.
- C. Human papilloma virus.
- D. Baculovirus.

ANSWER: A

129. Viruses used to infect insect cell lines are _____.

- A. Retroviruses.
- B. Baculovirus.
- C. Vaccinia viruses.
- D. Adenoviruses.

ANSWER: B

130. SV40 viruses are _____ viruses.

- A. plant.
- B. bacterial.
- C. insect.
- D. animal.

ANSWER: D

131. A project designed to map the location of every gene in all human chromosome is the _____.
- A. Human genetics.
 - B. Human genome Project.
 - C. Gene pool.
 - D. Human Genome Analysis.

ANSWER: B

132. An antibiotic that affects the formation of the cell wall is _____.
- A. tetracyclin.
 - B. ampicillin.
 - C. penicillin.
 - D. streptomycin.

ANSWER: C

133. Antibiotics are _____ metabolites.
- A. primary.
 - B. secondary.
 - C. tertiary.
 - D. quaternary.

ANSWER: B

134. Which of the following nucleotide bases is NOT found in RNA?
- A. Thymine.
 - B. Adenine.
 - C. Uracil.
 - D. Guanine.

ANSWER: A

135. Which of the following molecules does NOT form part of DNA?
- A. Purine.
 - B. Pyrimidine.
 - C. Amino acid.
 - D. Phosphate.

ANSWER: C

136. The transcription of DNA to messenger RNA occurs _____.
- A. on the ribosomes.
 - B. in the cytosol.
 - C. in the nucleus.
 - D. only during cell division.

ANSWER: C

137. The process of translation requires the presence of _____.
- A. mRNA, tRNA and ribosomes.
 - B. mRNA, ribosomes and RNA polymerase.
 - C. DNA, mRNA and RNA polymerase.
 - D. chromatin, DNA and amino acids.

ANSWER: A

138. Mutations are errors in DNA that _____.
- A. are always harmful.
 - B. only occur in the presence of carcinogens.
 - C. increase tumour growth.
 - D. occur spontaneously at a low rate.

ANSWER: D

139. Which of the following method of quantification is based on fluorescent staining of DNA?
- A. Agarose gel electrophoresis.

- B. Spectrophotometry.
- C. Chromatography.
- D. Alkaline lysis method.

ANSWER: A

140. The method of DNA quantification used for SSR and RAPD analysis is _____.

- A. Spectrophotometry.
- B. Agarose gel electrophoresis.
- C. Chromatography.
- D. Alkaline lysis method.

ANSWER: B

141. Which method of DNA quantification is performed with the help of UV absorption?

- A. Agarose gel electrophoresis.
- B. Spectrophotometry.
- C. Chromatography.
- D. Alkaline lysis method.

ANSWER: B

142. Which of the following is correct in terms of determination of location of genetic traits?

- A. Known protein coding sequences are too far apart to allow linkage determination for most new genes
- B. Restriction sites allow DNAs to be digested
- C. Protein-coding genes are always associated with a restriction pattern
- D. None of the above

ANSWER: A

143. mRNAs carry _____ tail at 3- end.

- A. poly A.
- B. poly U.
- C. poly G.
- D. poly C.

ANSWER: A

144. What are the components of a promoter?

- A. TATA box.
- B. CAAT box.
- C. -43 sequence.
- D. All the above.

ANSWER: D

145. The regions of DNA in a eukaryotic gene that encode a polypeptide product are called _____.

- A. hnRNAs.
- B. exons.
- C. enhancers.
- D. leader sequences.

ANSWER: B

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

- A. rRNA.
- B. mRNA.
- C. tRNA.
- D. snRNA.

ANSWER: B

147. Who first gave experimental evidence that DNA is the genetic material?

- A. Garrod.
- B. Beadle and Tatum.

- C. Meselson and Stahl.
- D. Avery, MacLeod, and McCarty.

ANSWER: D

148. Three types of RNA involved in comprising the structural and functional core for protein synthesis, serving as a template for translation, and transporting amino acid, respectively, are _____.

- A. mRNA, tRNA, rRNA.
- B. rRNA, tRNA, mRNA.
- C. tRNA, mRNA, rRNA.
- D. rRNA, mRNA, tRNA.

ANSWER: D

149. First discovered, Type II restriction endonuclease was

- A. Hinf I
- B. Eco K
- C. Hind II
- D. EcoRI

ANSWER: C

150. Which of the following primers would allow copying of the single-stranded DNA sequence 5-ATGCCTAGGTC -3?

- A. 5- ATGCC- 3.
- B. 5- TACGG- 3.
- C. 5- CTGGA- 3.
- D. 5- GACCT- 3.

ANSWER: D

151. Which of the following is the restriction site for the enzyme HindIII?

- A. restriction endonucleases - production of DNA fragments for gene cloning.
- B. DNA ligase - enzyme that cuts DNA, creating sticky ends.
- C. DNA polymerase - copies DNA sequences in the polymerase chain reaction.
- D. Reverse transcriptase - production of cDNA from mRNA.

ANSWER: B

152. DNA from an eukaryotic organism is digested with restriction endonucleases and the resulting fragments cloned into a plasmid vector. Bacteria transformed by these plasmids collectively contain all of the genes of the organism and is referred as _____.

- A. restriction map.
- B. RFLP profile.
- C. F' factor.
- D. gene library.

ANSWER: D

153. 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

154. Restriction enzymes

- A. protect bacteria from viral infection
- B. cut DNA in a staggered fashion
- C. cut DNAs producing a blunt end
- D. all of the above

ANSWER: D

155. What is the function of alkaline phosphatase?

- A. Elongate DNA.
- B. Add phosphate group.
- C. Remove phosphate group.
- D. Form phosphodiester bond.

ANSWER: C

156. Which of the following seals the sticky ends of restriction fragments to make recombinant DNA?

- A. Reverse transcriptase.
- B. Restriction enzymes.
- C. DNA Polymerase.
- D. DNA ligase.

ANSWER: D

157. The new tools of genetic engineering allow us to manipulate _____ directly.

- A. RNA.
- B. DNA.
- C. cell membranes.
- D. bacteria.

ANSWER: B

158. For this year's corn crop a farmer chooses to plant the seeds of the best-tasting corn plants from last year's crop. This is an example of _____.

- A. artificial selection.
- B. natural selection.
- C. gene cloning.
- D. whole animal cloning.

ANSWER: A

159. Which of the following genetic diseases would be amenable to genetic engineering?

- A. hemophilia
- B. cystic fibrosis
- C. AIDS
- D. Breast cancer

ANSWER: B

160. In addition to their circular chromosome, bacteria also have smaller rings of DNA called _____.

- A. Genes.
- B. Cells.
- C. Plasmids.
- D. Genome.

ANSWER: C

161. From which organism the enzyme Taq polymerase was isolated?

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

ANSWER: C

162. The purpose of PCR is to _____.

- A. make more copies of DNA primers to increase protein synthesis.
- B. make many copies of an organisms DNA sequence.
- C. make more RNA so large units of protein can be synthesized.
- D. cycle DNA using thermocycler.

ANSWER: B

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

- A. Deoxyribonucleotides.
- B. Primers.
- C. Thermostable DNA polymerase.
- D. All the above.

ANSWER: D

164. In gel electrophoresis, DNA molecules migrate from _____ to _____ ends of the gel.

- A. negative ... positive
- B. basic ... acidic
- C. long ... short
- D. positive to negative

ANSWER: A

165. PCR requires all of the following EXCEPT _____.

- A. primers.
- B. dNTPs.
- C. DNA of interest.
- D. topoisomerase.

ANSWER: D

166. If you start with one double-stranded DNA molecule and you perform SIX cycles of PCR, how many double-stranded copies of the DNA will you have?

- A. 6.
- B. 8.
- C. 16.
- D. 64.

ANSWER: D

167. 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

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

- A. RNA primers.
- B. Deoxy ribonucleotides.
- C. Ribonucleotides.
- D. DNA molecules.

ANSWER: A

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

- A. Taq polymerase.
- B. Deoxy ribonucleotides.
- C. Ribonucleotides.
- D. DNA molecules.

ANSWER: A

170. Griffith used which of the following to study the principle of transformation?

- A. Guinea pig.
- B. Mouse.
- C. Rabbit.
- D. E.coli.

ANSWER: B

171. 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

172. The skin is produced from _____.

- A. Endoderm.
- B. Ectoderm.
- C. Mesoderm.
- D. inner cell mass.

ANSWER: B

173. Before birth, a female's oocytes are arrested in _____.

- A. metaphase of mitosis.
- B. prophase I of meiosis.
- C. prophase II of meiosis.
- D. prophase of mitosis.

ANSWER: B

174. The formation of a fertilized ovum usually occurs in the _____.

- A. cervix.
- B. ovaries.
- C. uterine tube.
- D. placenta.

ANSWER: C

175. Egg and sperm are _____.

- A. monoploid.
- B. haploid.
- C. diploid.
- D. triploid.

ANSWER: B

176. Both DNA gel electrophoresis and SDS-PAGE of proteins are similar because

- A. in both cases molecules migrate to the anode
- B. both techniques rely on a constant charge to mass ratio
- C. both techniques utilize the sieving properties of gels
- D. all of the above

ANSWER: D

177. Infectious diseases are caused due to _____.

- A. living organism.
- B. genetic variation.
- C. nutrient deficiency.
- D. all the above.

ANSWER: A

178. The inducer used in blue white screening is _____.

- A. X-gal.
- B. IPTG.
- C. lactose.
- D. allolactose.

ANSWER: B

179. 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

180. 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

181. In sickle cell anemia, the abnormal cells are destroyed in the _____.

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

ANSWER: B

182. Cystic fibrosis is _____.

- A. characterized by mucus secretion.
- B. results in chronic respiratory disease.
- C. an inherited disorder.
- D. all the above.

ANSWER: C

183. Chromosome is made up of _____.

- A. Proteins.
- B. RNA.
- C. DNA.
- D. a and c.

ANSWER: D

184. When was Snuppy created?

- A. 2000.
- B. 2002.
- C. 2004.
- D. 2005.

ANSWER: D

185. The histone present in linker DNA is _____.

- A. H2A.
- B. H2B.
- C. H1.
- D. H3.

ANSWER: C

186. The regions of DNA in a eukaryotic gene that encode a polypeptide product are called _____.

- A. hnRNAs.
- B. exons.
- C. enhancers.
- D. leader sequences.

ANSWER: B

187. Which of the following molecules carries the anticodon?

- A. hnRNA.
- B. mRNA.
- C. tRNA.
- D. rRNA.

ANSWER: C

188. Restriction enzymes require _____ to act.

- A. ds DNA.
- B. ss DNA.
- C. RNA.
- D. a and b.

ANSWER: A

189. The enzyme that makes a transient cut in only one strand of dsDNA is _____.

- A. restriction enzymes.
- B. DNA ligase.
- C. topoisomerase I.
- D. topoisomerase II.

ANSWER: C

190. _____ protect bacteria against bacteriophage by cutting viral DNA.

- A. DNA polymerase.
- B. Restriction endonuclease.
- C. DNA ligase.
- D. Topoisomerase.

ANSWER: B

191. _____ is a key enzyme that seals the restriction fragment with sticky ends of vector.

- A. DNA polymerase enzyme.
- B. DNA ligase enzyme.
- C. Restriction enzyme.
- D. A and B.

ANSWER: B

192. Which of the following enzyme is involved in concatenation & deconcatenation?

- A. Topoisomerase I.
- B. Topoisomerase II.
- C. DNA polymerase.
- D. Reverse transcriptase.

ANSWER: B

193. The gene carried by recombinant molecule is said to be _____.

- A. cloned.
- B. copied.
- C. multiplied.
- D. engineered.

ANSWER: A

194. The similarity in the DNA of two different organisms can be determined and studied by _____.

- A. DNA finger printing.
- B. SDS-PAGE.
- C. SAGE.
- D. PCR.

ANSWER: A

195. The enzyme that makes a transient cut in both the strands of DNA is _____.

- A. restriction enzymes.
- B. DNA ligase.
- C. topoisomerase I.
- D. topoisomerase II.

ANSWER: D

196. Swapping an inactivated allele for a gene of interest produces a _____ mouse.

- A. knock out.
- B. gene targeted.
- C. knock in.
- D. transgenic.

ANSWER: C

197. Pick out the ODD one.

- A. Southern blotting.
- B. PCR.
- C. RAPD.
- D. Western blotting.

ANSWER: D

198. 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

199. Which of the following method uses electric pulses to transfer DNA?

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

ANSWER: A

200. A microarray is a/an _____.

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

ANSWER: A

201. 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

202. Which of the following is used as an excipient?

- A. Polysorbate 20.
- B. Phosphate buffer salts.
- C. Glycine.
- D. All the above.

ANSWER: D

203. 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

204. _____ is a DNA sequence variation occurring when a single nucleotide differs between

members of a species.

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

ANSWER: D

205. Luciferase reporter phage is used in the diagnosis of _____.

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

ANSWER: D

206. Restriction enzymes are named for

- A. the person who discovered
- B. the bacterium they are derived from
- C. the viral DNA that they attack
- D. none of the above

ANSWER: B

207. Advantages of polymerase chain reaction which of the following?

- A. The reaction is specific for certain sequences in the DNA.
- B. The results can be obtained with DNA that is old or partially degraded.
- C. Only small amount of template is needed.
- D. All the above.

ANSWER: D

208. One important approach in gene cloning uses _____.

- A. plasmids.
- B. whole chromosomes.
- C. bacteria.
- D. b and c.

ANSWER: D

209. Current applications of gene cloning include _____.

- A. cleaning up toxic waste.
- B. incorporating pest resistance in plants.
- C. manufacturing human growth hormone.
- D. All the above.

ANSWER: D

210. The Plasmid used by Cohen and Boyer for Transformation experiment was

- A. pSC101
- B. PV060
- C. pBR322
- D. PUV17

ANSWER: A

211. Which of the following set of enzymes are primarily needed to produce recombinant DNA?

- A. DNA polymerase, topoisomerase.
- B. Restriction enzyme, ligase.
- C. Polymerase, ligase.
- D. Transcriptase, ligase.

ANSWER: B

212. What is a cloning vector?

- A. An agent, such as a plasmid, used to transfer DNA from an in vitro solution into a living cell.

- B. The sticky end of a DNA fragment.
- C. The laboratory apparatus used to clone genes.
- D. The enzyme that cuts DNA into restriction fragments.

ANSWER: A

213. When populations are small, gene frequencies can change from generation to generation and some alleles may become fixed in a population. This is called

- A. assortative mating
- B. inbreeding
- C. heterosis
- D. genetic drift

ANSWER: D

214. Mechanism of intake of DNA Fragments from the surrounding medium by a cell is called

- A. Conjugation
- B. Translation
- C. Transformation
- D. Elongation

ANSWER: C

215. Which of these restriction enzymes produce blunt ends?

- A. SaII
- B. EcoRV
- C. XhoI
- D. HindIII

ANSWER: B

216. pBR322 was constructed by _____ in the year _____.

- A. Bolivar and Rodriguez, 1977.
- B. Bolivar and Rodriguez, 1980.
- C. Paulberg and Rodriguez, 1977.
- D. Paulberg and Bolivar, 1980.

ANSWER: A

217. The Father of recombinant DNA technology is _____.

- A. Cohen.
- B. Boyer.
- C. Paulberg.
- D. Cohen and Boyer.

ANSWER: C

218. Protein can be separated by _____.

- A. SDS-PAGE.
- B. Electrophoresis.
- C. Agarose electrophoresis.
- D. Pulse field gel electrophoresis.

ANSWER: A

219. A polylinker is a/an _____.

- A. adaptor.
- B. linker.
- C. multiple cloning site.
- D. selectable marker.

ANSWER: C

220. The size of the yeast genome is _____ Mb.

- A. ~12.
- B. ~16.

C. ~18.

D. ~20.

ANSWER: A

221. . The most important application of artificial chromosomes is _____.

A. cloning large fragments of DNA.

B. increased insert size above 1000 kb.

C. construction of genomic DNA libraries.

D. genome projects.

ANSWER: C

222. The method of recombinant selection in pUC vectors is _____.

A. physical selection.

B. insertional inactivation.

C. indirect selection.

D. alpha complementation.

ANSWER: D

223. Pick the ODD man out.

A. YAC.

B. pUC 18.

C. pBR 322.

D. pSV40.

ANSWER: C

224. Which of the following is not a part of pBR322?

A. Ampr.

B. Tetr.

C. Lac Z.

D. Ori.

ANSWER: C

225. The DNA segment to be cloned is called

A. DNA ligase

B. DNA insert

C. DNA structure

D. DNA standard

ANSWER: B

226. Which of the following is NOT a phage vector?

A. Cosmid.

B. Phagemid.

C. Plasmid.

D. Phasmid.

ANSWER: C

227. Restriction enzymes were discovered by _____.

A. Arthur Kornberg.

B. Cohen and Boyer.

C. Werner Arber.

D. Paulberg.

ANSWER: C

228. The cleavage site of EcoRI is _____.

A. 5- GAATTC 3 3- CTTAAG 5.

B. 5- GAATTC 3 3- CTTAAG 5.

C. 5- GAATTC 3 3- CTTAAG 5.

D. 5- GAATTC 3 3- CTTAAG 5.

ANSWER: B

229. DNA Polymerase without 5- to 3- exonuclease activity is _____.

- A. DNA Pol II.
- B. DNA Pol III.
- C. Klenow fragment.
- D. DNA Pol I.

ANSWER: C

230. The enzyme that is capable of adding phosphate groups is _____.

- A. terminal transferase.
- B. methylase.
- C. alkaline phosphatase.
- D. polynucleotide kinase.

ANSWER: D

231. The cofactor of DNA ligase from E.coli is _____.

- A. NAD.
- B. ATP.
- C. AMP.
- D. manganese.

ANSWER: A

232. Which of the following is an RNA dependant DNA polymerase?

- A. Taq polymerase.
- B. RNA polymerase.
- C. Transcriptase.
- D. Reverse transcriptase.

ANSWER: D

233. Thermostable polymerase with proof reading activity is _____.

- A. Taq Pol.
- B. Pfu Pol.
- C. Tth Pol.
- D. Vent Pol.

ANSWER: D

234. Molecular scissors is the term coined for _____.

- A. Type I Restriction endonucleases.
- B. Type II Restriction endonucleases.
- C. Type III Restriction endonucleases.
- D. Type IV Restriction endonucleases.

ANSWER: B

235. The enzyme used to join nicks is _____.

- A. Klenow fragment.
- B. ligase.
- C. polymerase.
- D. nuclease.

ANSWER: B

236. Positive and negative supercoils are introduced by which enzyme?

- A. Isomerase.
- B. Polymerase.
- C. Ligase.
- D. DNA Gyrase.

ANSWER: D

237. cDNA stands for _____.

- A. complementary DNA.
- B. correct DNA.
- C. consensus DNA.
- D. compact DNA.

ANSWER: A

238. Microcarrier material in particle bombardment is _____.

- A. gold/ iron.
- B. tungsten/ iron.
- C. gold/ tungsten.
- D. gold/ silver.

ANSWER: C

239. Pick the ODD man out.

- A. Particle bombardment.
- B. Protoplast fusion.
- C. Electroporation.
- D. Lipofection.

ANSWER: D

240. Northern transfer involves _____.

- A. transfer of RNA onto nitrocellulose.
- B. hybridization of RNA to probe.
- C. transfer of DNA and RNA onto nitrocellulose.
- D. transfer of RNA and protein onto nitrocellulose.

ANSWER: A

241. Which of the following techniques can be used to determine the defective gene and for developing cancer?

- A. western blot
- B. southern blot
- C. northern blot
- D. eastern blot

ANSWER: B

242. Some genetic diseases cannot be diagnosed by changes in restriction sites. Some of these can be detected by allele-specific oligonucleotide probes. These are

- A. copies of the gene with an altered sequence so that a restriction site is inserted
- B. mutagenized copies of a gene
- C. short sequences that will hybridize only to a specific base sequence
- D. PCR-amplified variable numbers of tandem repeats (VNTRs)

ANSWER: C

243. Bacterial transformation essentially requires the cell to have _____.

- A. CaCl₂.
- B. DNA nuclease.
- C. SSB.
- D. Competence.

ANSWER: D

244. Molecular markers can be developed using which of the following techniques?

- A. PCR.
- B. DNA fingerprinting.
- C. ESTs.
- D. RAPD.

ANSWER: D

245. Isoschizomers recognize

- A. same recognition sequence but different recognition site
- B. same recognition site and recognition sequence
- C. same recognition site and different recognition sequence
- D. different recognition site and different recognition sequence

ANSWER: B

246. The enzyme not used in polymerase chain reaction _____.

- A. Taq polymerase.
- B. Vent polymerase.
- C. Reverse transcriptase.
- D. DNA polymerase.

ANSWER: D

247. PCR was invented in _____.

- A. 1983.
- B. 1980.
- C. 1985.
- D. 1981.

ANSWER: A

248. The technique used to study gene expression is _____.

- A. PCR.
- B. ESTs.
- C. DNA Fingerprinting.
- D. Microarray.

ANSWER: D

249. The first recombinant protein to be produced is _____.

- A. interleukins.
- B. Humulin.
- C. erythropoietin.
- D. factor VIII.

ANSWER: B

250. In order to insert a foreign gene into a plasmid, both must

- A. have identical DNA sequences
- B. originate from the same type of cell
- C. be cut by the same restriction enzyme
- D. be of the same length

ANSWER: C

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