

## 10 — BIO-TECHNOLOGY

(Answer ALL questions)

56. A competitive inhibitor of an enzyme is usually
1. A highly reactive compound
  2. A metal ion
  3. Structurally similar to the substrate
  4. Water insoluble
57. The effect of non-competitive inhibition on a Lineweaver-Burk Plot is that
1. it can move the entire curve to the right
  2. it can change the y-intercept
  3. it can change the x-intercept
  4. all of these
58. Stationary phase is described as
1. no further increase in the cell population after a maximum value
  2. deceleration of growth and division rate after the growth rate reaches a maximum
  3. acceleration of growth and division rate after the growth rate reaches a maximum
  4. deceleration of growth and division rate after the growth rate reaches a minimum
59. The monod model predicts that the specific growth rate
1. will increase with the concentration of the growth limiting substrate until it reaches a maximum value
  2. will decrease with the concentration of the growth limiting substrate
  3. will increase with the concentration of the growth limiting substrate
  4. does not depend on growth limiting substrate
60. The dilution rate,  $D$  is defined as (where  $F$  = volumetric flow rate,  $V_R$  = total volume of culture in the reactor and  $\mu$  specific growth rate)
1.  $F/V_R$
  2.  $V_R/F$
  3.  $\mu/F$
  4.  $F/\mu$
61. Anaerobic fermentation liberates \_\_\_\_\_ due to \_\_\_\_\_ oxidation of substrate.
1. less energy and complete
  2. high energy and complete
  3. less energy and incomplete
  4. high energy and incomplete
62. Enzymes increases the reaction rate by
1. increasing  $K_m$
  2. decreasing activation energy
  3. increasing initial velocity
  4. all of the above
63. SDS-PAGE separates protein molecules based on the
1. charge
  2. conformation
  3. molecular weight
  4. all of the above
64. The ratio of absorbance at 260 and 280 ( $A_{260}/A_{280}$ ) is used to determine the \_\_\_\_\_ nucleic acid preparation.
1. purity
  2. integrity
  3. concentration
  4. all of the above
65. The proteins will have \_\_\_\_\_ absorption at 280 nm when they are rich in \_\_\_\_\_ amino acids.
1. High and aliphatic
  2. Low and sulfur containing
  3. High and aromatic
  4. Low and hydroxyl group
66. Double stranded DNA has lower absorption at 260 nm than single stranded DNA due to
1. Increased base stacking
  2. Thiamine
  3. Deoxyribose
  4. Thymine



67. Poly Unsaturated Fatty Acids (PUFAs) are \_\_\_\_\_ stable and produces \_\_\_\_\_ energy than saturated fatty acids.
1. less and less
  2. more and more
  3. less and more
  4. more and less
68. Which of the following amino acids do not have chiral carbon?
1. Glycine
  2. Proline
  3. Aspartic acid
  4. Tyrosine
69. Free energy is \_\_\_\_\_ for a spontaneous process.
1. zero
  2. positive
  3. negative
  4. all the above
70. If the phospholipids had only one hydrocarbon chain instead of two, which of the following predicted property of lipid bilayers would result?
1. The bilayers formed would be much less fluid
  2. The diameter of the head group would be much larger than the acyl chain and would tend to form micelles rather than bilayers
  3. The bilayer formed would be much more fluid
  4. The bilayers would be more permeable to small water soluble molecules
71. The planarity of peptide bond is
1. Due to restriction caused by rotation around  $C^\alpha - N$
  2. Due to restriction around  $C^\alpha - C'$  bond
  3. Due to delocalization of the lone pair of electrons of the nitrogen onto carbonyl oxygen
  4. Because amide protons and carbonyl oxygen are involved in hydrogen binding
72. Red blood cells generate ATP through
1. Oxidative phosphorylation
  2. Substrate level phosphorylation
  3. Photosensitive phosphorylation
  4. All the above
73. Which of the following can be used to determine the rate of enzyme catalyzed reactions?
1. rate of disappearance of the enzyme
  2. rate of disappearance of the substrate
  3. rate of disappearance of the product
  4. change in volume of the solution
74. Which of the following compound is not a substrate for gluconeogenesis pathway?
1. Lactate
  2. Pyruvate
  3. Alanine
  4. Glycogen
75. Which one of the following is associated with bacterial cells?
1. Ribosomes
  2. Nucleus
  3. Lysosomes
  4. Chloroplasts
76. Circular plasmid DNA with single stranded nick results in the loss of
1. double helical structure
  2. supercoils
  3. information
  4. none of the above
77. When  $A \neq T$  and  $G \neq C$  then the DNA is
1. Single helix
  2. Double helix
  3. No helix
  4. None of the above
78. The melting temperature ( $T_m$ ) of a double stranded DNA decreases by
1. increasing A:T content
  2. decreasing ionic strength
  3. increasing hydration
  4. all of the above
79. The overall shape of a bacterial cell is determined by which of the following?
1. Cell wall
  2. Nucleoid
  3. Cytoskeleton
  4. Cell membrane



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80. Which of the following microscopy techniques relies on the specimen interfering with the wavelength of light to produce a high contrast image without the need for dyes or any damage to the sample?
1. Conventional bright field light microscopy
  2. Phase contrast microscopy
  3. Electron microscopy
  4. Fluorescence microscopy
81. Identify the WRONG statement about biomembranes?
1. Membrane lipids are composed of amphipathic molecules
  2. Scramblases and flippases are able to catalyze the transfer of lipid molecules between the outer and inner leaflets
  3. Membrane lipids are able to spontaneously move between the outer and inner leaflets
  4. Different lipid compositions are found in the two leaflets of a membrane
82. Within the nucleus, individual chromosomes are thought to occupy discrete territories. Which of the following is most likely to promote this segregation?
1. Nuclear lamina
  2. Nuclear pore complexes
  3. Nuclear matrix/scaffold
  4. Intermediate fibres
83. Semiautonomous organelle in the cell is
1. Peroxisomes
  2. Chloroplasts
  3. Endoplasmic reticulum
  4. Golgibodies
84. \_\_\_\_\_ is the enzyme used as a marker for the lysosomes.
1. Pyruvate dehydrogenase
  2. Phospholipase
  3. Acid phosphatase
  4. Succinate dehydrogenase
85. Identify the wrong statement about cytoskeleton.
1. It occupies the general nucleoplasm as well as occurring in the cytosol
  2. It is typically composed of three types of fibrous protein systems
  3. It consists in part of networks of fibrous proteins
  4. Its protein components have been highly conserved throughout evolution
86. Membrane fluidity increases by
1. increasing unsaturated fatty acids
  2. decreasing fatty acid chain length
  3. increasing temperature
  4. all of the above
87. Which one of the following vector is best in rDNA technology?
1. Vector-1 (Antibiotic resistance gene<sup>+</sup>)
  2. Vector-2 (Antibiotic resistance gene<sup>-</sup>)
  3. Vector-3 (Antibiotic resistance gene<sup>-</sup>/lac Z<sup>+</sup>)
  4. Vector-4 (Antibiotic resistance gene<sup>-</sup>/Sac B<sup>+</sup>)
88. Identify the WRONG statements.
1. Expression vector is also a cloning vector but not vice versa
  2. Plasmids with similar replication and partitioning systems are compatible
  3. A plasmid which produces many replication proteins will have broad host range
  4. It is advantageous to eliminate restriction systems in host in rDNA technology
89. Identify the WRONG statements about 'cos' site.
1. Used to circularize  $\lambda$ -DNA and cosmid DNA inside the host
  2. Important to package  $\lambda$ -DNA and cosmid DNA in viral particles
  3. Involved in the formation of concatameric  $\lambda$ -DNA
  4. Responsible for lysogenization of both  $\lambda$ -DNA and cosmid DNA in host genome



90. Identify the WRONG statements about  $\text{Spi}^-$  selection.
1. It is essential to replace the red and gam region  $\lambda$ -DNA with insert
  2. It is necessary to perform purification to remove the stuffer fragment to proceed for ligation
  3. Utilizes P2 phage lysogenized E. coli for selection
  4. Only recombinant DNA with 37-52 kb size is selected
91. Which of the following DNA is a direct substrate for homopolymer tailing?
1. DNA fragment with 3'-overhang
  2. DNA fragment with 5'-overhang
  3. Blunt end DNA
  4. None of the above
92. In Touchdown PCR, the annealing temperature is
1. Steadily decreased
  2. Steadily increase
  3. Equal to  $T_m$
  4. None of the above
93. Identify the WRONG statement.
1. Instead of 5'-P and 3'-OH, the primers with 5'-OH and 3'-OH can also be used in PCR amplification
  2. Hot-Start PCR requires denaturation of anti-Taq DNA polymerase
  3. Assembly PCR utilizes overlapping oligonucleotides
  4. Inverse PCR read the DNA template in 5'-3' direction and synthesizes new strand in 3'-5' direction
94. Taqman probe based real-time PCR is advantageous than SYBR green method due to the following reasons, except
1. Multiplexing is possible with Taqman PCR
  2. Taqman method do not detect non-specific amplification
  3. Amplification efficiency is calculated at exponential phase in Taqman method
  4. Melting curve analysis is more efficient in Taqman method
95. Which of the following statement is incorrect with respect to pyrosequencing?
1. Pyrosequencing do not require primer
  2. Pyrosequencing is based on coupled enzymatic reactions
  3. Pyrosequencing involves single stranded DNA as template
  4. Nucleotide addition in pyrosequencing emits light
96. Which of the following is not relevant in preparing template for Sanger's sequencing?
1. M13 vector
  2. LATE-PCR
  3. Assembly PCR
  4. Asymmetric PCR
97. Which one of the following mast cell products is not preformed and therefore has to be newly synthesized?
1. Histamine
  2. Prostaglandin D2
  3. Heparin
  4. Eosinophil chemotactic factor
98. Type I hypersensitivity can be blocked using
1. Histamine
  2. Interleukin-5
  3. Sodium cromoglycate
  4. A myeloma protein of mixed antibody class
99. Defects in neutrophil NADPH oxidase system produces
1. Chronic granulomatous disease
  2. Leukocyte adhesion deficiency
  3. Hashimoto's disease
  4. Chediak-Higashi disease
100. Poor skin tests to a range of microbial antigens such as tuberculin and mumps indicate a deficiency of
1. Natural killer cells
  2. T-Cells
  3. B-Cells
  4. Opsonization
101. HIV binds to
1. IL-2 receptor
  2. CD-4
  3. TNF receptor
  4. Reverse transcriptase



102. The circulation of a two month old breast-fed baby will contain maternal
1. IgA
  2. IgE
  3. IgG
  4. IgM
103. Several of the complement components are
1. Hormones
  2. Enzymes
  3. Cytokines
  4. Antibodies
104. Clonal selection occurs when antigen is encountered by
1. T-Cells
  2. Neutrophils
  3. Macrophages
  4. Mast cells
105. N-region insertion is associated with the expression of
1. Terminal deoxynucleotidyl transferase
  2. NK cell antigen receptor
  3. Heat shock protein
  4. The proteasome
106. Which of the following is the earliest site of hematopoiesis in the embryo?
1. Bone marrow
  2. Liver
  3. Spleen
  4. Yolk sac
107. Phylogenetic relationship can be shown by
1. Dendrogram
  2. Gene Bank
  3. Data retrieving tool
  4. Data search tool
108. Clustal W is a
1. Protein secondary structure predicting tool
  2. Multiple sequence alignment tool
  3. Nucleic acid sequence analysis tool
  4. Data retrieving tool
109. Which one of the following is a nucleotide sequence data base?
1. EMBL
  2. SWISS PROT
  3. PROSITE
  4. TREMBL
110. A data base of current sequence map of the human genome is called
1. OMIM
  2. HGMD
  3. Golden Path
  4. GeneCards
111. Alignment method suitable for aligning closely related sequence is
1. Multiple sequence alignment
  2. Global alignment
  3. Pair wise alignment
  4. Local alignment
112. Sequence alignment helps to
1. Trace our evolutionary relationships
  2. Infer the functions of newly synthesized genes
  3. Predict the new member of gene families
  4. All of the above
113. The alignment method suitable for finding out conserved patterns in DNA or protein sequence is
1. Multiple sequence alignment
  2. Global alignment
  3. Pair wise alignment
  4. Local alignment
114. The process of finding relative location of genes on a chromosome is called
1. Gene tracing
  2. Genome mapping
  3. Genome walking
  4. Chromosome walking
115. The computational methodology that tries to find the best matching between two molecule, a receptor and ligand is called
1. Molecular matching
  2. Molecular docking
  3. Molecular fitting
  4. Molecular affinity checking