

PART III

10 - BIO-TECHNOLOGY

(Answer ALL questions)

56. The most comprehensive model depicting the growth of cell mass in a bioreactor is
- unstructured and un-segregated
 - unstructured and segregated
 - structured and un-segregated
 - structured and segregated
57. In continuous cultivation, turbidostat is more stable than chemostat when the
- dilution rate is very low
 - dilution rate is near maximum specific growth rate
 - dilution is to be maintained at a constant rate
 - cell density needs to be very high
58. In a stirred tank reactor, when the agitation rate is increased, the k_L and $k_L a$ values will
- increase and decrease respectively
 - decrease and increase respectively
 - increase in both
 - decrease in both
59. For enzymes immobilized in a porous matrix, which of the following statements is true?
- The Thiele modulus is always infinity
 - Mass transfer limits enzyme effectiveness
 - Effectiveness factor is always unity
 - Specific activity of the immobilized enzymes always increases
60. For mixing solid contents of the media in a media mixing tanks, inclined blade turbine is used because, it
- acts like an axial flow impeller with downward movement of liquid
 - draws less power compared to flat blade turbine
 - prevents vortex formation
 - is a radial flow impeller with sideward movement of liquid
61. Which of the following method is not used for volumetric mass transfer coefficient determination?
- sodium-sulfite oxidation method
 - dynamic method of gassing out
 - static method of gassing out
 - carbon dioxide balance method
62. Baffles are provided in CSTR for _____ of the velocity of fluid flow.
- retarding the radial component
 - retarding the axial component
 - retarding the circular component
 - improving the radial component
63. Immobilization of enzyme by using calcium alginate is
- Entrapment
 - Adsorption
 - Covalent binding
 - Ionic interaction
64. By double-reciprocal plot
- V_{max} can be estimated accurately
 - K_m can be estimated accurately
 - Both V_{max} and K_m can be estimated accurately
 - V_{max} and K_m cannot be estimated
65. In transient flow regime, power number is _____ the Impeller Reynolds number
- directly proportional to
 - inversely proportional to
 - independent of
 - non linearly related to
66. Connexon plays vital role in cell-cell junction of
- Tight junction
 - Gap junction
 - Desmosomes
 - Hemidesmosome

67. The translocation of GLUT4 protein on the membrane is regulated by
- Glucagon
 - Glucocorticosteroids
 - Insulin
 - Thyroid hormone
68. Calmodulin, IP3 and cGMP are examples of
- Vasodilators
 - Neuro transmitters
 - Second messengers
 - Coenzymes
69. Ras protein is associated with the following function
- GTPase
 - Adenylyl cyclase
 - Phosphodiesterase
 - ATPase
70. Which one of the following is not true about promoter?
- A binding site for RNA polymerase
 - A binding site for transcription factor
 - Located at upstream of coding region
 - A binding site for Rho factor
71. Increased activity of Histone acetyltransferases leads to
- Up regulation transcription
 - Down regulation transcription
 - No effect on transcription
 - Inhibit replication
72. Cell lines are kept and maintained in CO₂ incubators, wherein percentage of CO₂ is
- 1%
 - 5%
 - 10%
 - 20%
73. DNA repair through Non-homologous end joining is due to
- Pyrimidine dimerization
 - Missense mutation
 - Single-strand breaks in DNA
 - Double-strand breaks in DNA
74. Non disjunction during cell division leads to
- Unequal segregation of chromosomes in daughter cell
 - Equal segregation of chromosomes in daughter cell
 - Activation of p53
 - Activation of Anaphase promoting complex
75. The sequences of codons that begin with a start codon and ends at a stop codon is
- Open reading frame
 - Intron
 - Nascent mRNA
 - Closed reading frame
76. Increased levels of intracellular Inositol triphosphate (IP3) results in the release of Ca²⁺ from
- peroxisome
 - lysosome
 - mitochondrion
 - endoplasmic reticulum
77. Which among the following is a precursor for glycogen?
- malate
 - leucine and lysine
 - UDP - Glucose
 - glycerol 3 phosphate
78. Pepsin and urease are examples of this class of enzymes
- hydrolases
 - oxidoreductases
 - lyases
 - ligases
79. The first enzyme to be discovered, diastase, was discovered by
- Pasteur
 - Ansalme Payen
 - Edward Buchner
 - JB Sumner

80. Which of the following takes place in substrate level phosphorylation?
- Oxidation of one molecule of substrate is linked to synthesis of more than one ATP molecule
 - Substrate reacts to form a product containing a high energy bond
 - Only mitochondrial reactions participate in ATP formation
 - High energy intermediate compounds cannot be isolated
81. The scientist who proposed phylogenetic tree for living things
- Louis Pasteur
 - Carlo Urbani
 - Carl Woese
 - Robert Koch
82. The identification of bacteria by serologic tests is based on the presence of specific antigens. Which of the following bacterial components is least likely to contain useful antigens?
- Capsule
 - Ribosomes
 - Flagella
 - Cell wall
83. The product of Single cell protein is
- biomass obtained during cultivation
 - secreted extracellular proteins
 - extraction of intracellular protein
 - fermentation of waste products
84. In which of the following phase are secondary metabolites produced during microbial growth?
- lag phase
 - exponential phase
 - stationary phase
 - death phase
85. The ability of *Vibrio fischeri* to produce bioluminescence chemicals only when the population density reaches a particular level is called
- Liebig's law of minimum
 - Heisenberg's law of uncertainty
 - Quorum sensing
 - Law of tolerance
86. Which of the following is NOT considered as a host in rDNA technology (R-Restriction system; M-Modification system)?
- R+/M+
 - R-/M-
 - R-/M+
 - R+/M-
87. Which of the following overcomes the problem associated with single enzyme digestion based cloning?
- Alkaline phosphatase treatment
 - Terminal transferase treatment
 - Polynucleotide kinase treatment
 - Double digestion based cloning
88. Two different restriction enzymes which recognize different sequences but creates complementary ends are called
- Isoschizomers
 - Neoschizomers
 - Compatible enzymes
 - Star activity
89. DNA molecule with 3'-overhangs is converted into blunt end by
- DNA polymerase
 - 3'-5' endonuclease
 - 5'-3' exonuclease
 - DNA ligase
90. Which of the following is common to single digestion based cloning, homopolymer mediated cloning and TA cloning?
- Self-ligation
 - Orientation problem
 - Intermolecular ligation
 - Intramolecular ligation
91. Which one of the following primers will have low T_m value?
- High G:C
 - Low A:T
 - Degenerate primers
 - High A:T
92. In Touchdown PCR, the annealing temperature is
- Steadily decreased
 - Steadily increased
 - Equal to T_m
 - Constant

93. Chain termination method of DNA sequencing is due to the incorporation of
- 5' and 3'-ddNTP
 - 2' and 3'-ddNTP
 - 3'-ddNTP
 - 2'-ddNTP
94. Which of the following is NOT relevant in preparing template for Sanger's sequencing?
- M13 vector
 - LATE-PCR
 - Asymmetric PCR
 - Assembly PCR
95. SYBR green based real-time PCR is advantageous than end-point PCR because
- Both exponential and saturation phase can be identified
 - Multiplexing is possible
 - Non-specific amplification are excluded
 - Cost effectiveness
96. The immunologic stimulant of MF59 adjuvant contains
- Virosomes
 - Monophosphoryl lipid A
 - Squalene
 - Alum
97. The viral vaccine vectors which is a safe choice for retrovirus disease like HIV is
- pVAX vector
 - Canarypox vector
 - Adenovirus 5 vector
 - ONYX-015 vector
98. Aldesleukin is a recombinant cytokine used for cancer therapy that belongs to
- IL6
 - IL2
 - TNF alpha
 - IFN gamma
99. The Salk Vaccine is an example for
- Inactivated viral vaccine
 - Attenuated Viral vaccine
 - Live viral vaccine
 - Engineered viral vaccine
100. The cytokine that causes naïve CD4+ cells to differentiate as T-regs
- TGF beta
 - TNF alpha
 - IL-17
 - VEGF-D
101. The protein receptor that functions as an immune checkpoint for down-regulating immune responses.
- CD86
 - CD28
 - CD80
 - CD152
102. ABO-incompatible (ABOi) transplantation of grafts is possible for receipts with
- no production of isohemagglutinins below one year of age
 - no production of isohemagglutinins above one year of age
 - production of isohemagglutinins below one year of age
 - production of isohemagglutinins above one year of age
103. In humans the principal isotype in secretions and predominantly in the mucus epithelium of the intestinal and respiratory tracts.
- IgE
 - IgA
 - IgG
 - IgD
104. The alternative pathway C3 convertase is
- C3bBbD
 - C4b2b
 - C3bBbP
 - C3bBb
105. The IgG transport protein in the placenta that selectively transports IgG from mother to fetus is
- Fc-epsilonR
 - Fc-alphaR
 - Fc-gammaR
 - Fc-Rn

106. An algorithm which works only on sorted set of element is known as
- Exhaustive search algorithm
 - Selection sort algorithm
 - Binary search algorithm
 - Quick sort algorithm
107. Prediction of protein structures based on sequence homology with known structures is known as
- Hidden Markov Model
 - Molecular Modeling
 - Homology Modeling
 - Heterology Modeling
108. Which one of the following is NOT a Phylogenetic tree software?
- PHYLIP
 - GROMACS
 - PAUP
 - MEGA
109. A connecting point in a phylogenetic tree where two adjacent branches join is called as
- Node
 - Point
 - Joint
 - Dot
110. Percent Accepted Mutation Matrices are used for
- Docking of protein-ligand complex
 - Databases generation
 - Sequence alignment
 - Molecular simulation
111. BLOSUM62 substitution matrix is used for scoring
- Docking molecules
 - Protein sequence alignments
 - Molecular simulation of proteins
 - Searching of proteins
112. Which one of the following statement is NOT TRUE? Basic Local Alignment Search Tool is
- Sequence similarity search program
 - Used to compare query sequence to database of sequences
 - Tool which provides statistical information and significance about an alignment
 - Tool used to search for a sequence in biological databases
113. Which one of the following statement is NOT TRUE? Hidden Markov Model is
- Statistical model that considers all possible combinations of matches, mismatches and gaps to generate an alignment of a set of sequences
 - Used to analyze sequence composition and patterns
 - Used to produce protein structure predictions
 - Used to generate trajectories of a biomolecule
114. Which one of the following statement is NOT TRUE? An evolutionary tree is
- Always a binary tree
 - Composed of outer branches representing taxa
 - Composed of nodes and branches representing relationships among taxa
 - Which has more than one branch emanating from a node if the event separating taxa are so close
115. Needleman-Wunsch algorithm is used for
- Local alignment of sequences
 - Searching of sequences
 - Minimal alignment of sequences
 - Global alignment of sequences