

PART III

10 - BIO-TECHNOLOGY

(Answer ALL questions)

41. In scaling up agitators from lab model to Industrial scale, which one of the following is preferred as scale-up criterion?
- Mixing time
 - Reynolds No.
 - Power number
 - Power / volume of fermenter
42. Which of the following cells are most shear sensitive?
- mammalian
 - plant
 - bacteria
 - fungi
43. Majority of fermentation medium are pseudoplastic. Therefore, heat transfer and mass transfer rates are poor away from the impeller because
- density decreases
 - viscosity decreases
 - density increases
 - viscosity increases
44. The term $k_L a$ during operation of bioreactors refers to
- Liquid-liquid mass transfer coefficient
 - Distribution of gas bubble size as a function of mixing
 - Volumetric oxygen mass transfer coefficient
 - Dankwerts gas-liquid interfacial energy coefficient
45. Partition coefficient in two phase aqueous extraction is defined as concentration of solute in
- Extracte/raffinate
 - Extract/feed
 - Upper aqueous layer/ lower aqueous layer
 - Amount of solute extracted / amount of solute in feed
46. Michaelis Menten reaction is
- first order reaction
 - zero order reaction
 - changing order reaction
 - fractional order reaction
47. Arrhenius equation shows the variation of _____ with temperature
- reaction rate
 - rate constant
 - energy of activation
 - frequency factor
48. While $DV\rho/\mu$ is the general expression for Reynolds number and for agitator it is
- $n^2 D^2 \rho / \mu$
 - $n^2 D \rho / \mu$
 - $n D^2 \rho / \mu$
 - $n D \rho / \mu$
49. Which parameter gives performance of a centrifuge?
- g. number
 - sigma factor
 - separation ratio
 - capacity factor
50. A batch reactor is characterized by
- constant residence time
 - variation in extent of reaction and properties of the reaction mixture with time
 - variation in reactor volume
 - very low conversion
51. RNA primer at the 5' ends of Okazaki fragments in prokaryotes are removed by
- Ribonuclease Z
 - S1 nuclease
 - P1 nuclease
 - DNA pol I

52. Phosphorylation of serine residue on the eIF2 bound to GDP results in
- Initiation of protein synthesis
 - Inhibition of protein synthesis
 - Inhibition of DNA synthesis
 - Initiation of RNA synthesis
53. Premature or incomplete protein synthesis happens due to
- Nonsense mutation
 - Mutation of promoter region
 - Missense mutation
 - Frameshift mutation
54. Which one of the following has the ability to inhibit transcription?
- Neomycin
 - Kanamycin
 - Rifampicin
 - Quinolones
55. A double stranded DNA contains 42% of G and C. The percentage of 'T' is
- 58
 - 23
 - 29
 - 21
56. Which enzyme is involved in the base excision repair of DNA?
- Purine glycosylase
 - P1 nuclease
 - Endonuclease II
 - DNA glycosylase
57. Mitochondrial DNA replication is carried out by
- DNA polymerase gamma
 - DNA polymerase I
 - Pfu DNA polymerase
 - DNA polymerase alpha
58. Which one of the following is not true about promoter?
- They are sequence of DNA
 - Binds to RNA polymerase II during transcription
 - Located between operator and coding region
 - Mutation of promoter region affects transcription rate
59. Telomerase functions as
- DNA dependent RNA polymerase
 - DNA dependent DNA polymerase
 - RNA dependent DNA polymerase
 - RNA dependent RNA polymerase
60. The sequence of the structural genes in the lac operon is in the order of
- lacZ-lacA-lacY
 - lacZ-lacY-lacA
 - lacA-lacY-lacZ
 - lacA-lacZ-lacY
61. Which separation technique uses ligand to purify its receptor protein?
- Ion exchange chromatography
 - Expanded Bed Adsorption chromatography
 - Affinity chromatography
 - Size-exclusion chromatography
62. Lipogenesis is enhanced by
- Insulin
 - Epinephrine
 - Glucagon
 - Thyroxine
63. The cell organelle primarily responsible for the source of reactive oxygen species is
- Nucleus
 - Endoplasmic reticulum
 - Golgi apparatus
 - Mitochondria

64. Which one of the following cells depends primarily on glucose for energy?
- Lymphocyte
 - Differentiated adipocytes
 - Matured RBC
 - Muscle cells
65. Which of the tests is used to differentiate that the oil is rich in saturated or unsaturated fatty acids?
- Iodine number
 - Acid value
 - Saponification value
 - Acrolein test
66. Which is not a selective medium but is a differential medium?
- Blood agar
 - Mannitol salt agar
 - MacConkey agar
 - Eosin methylene blue agar
67. The time taken to kill 90% of the organisms or spores in a sample under specified condition is
- Thermal death time (TDT)
 - Decimal reduction time (D value)
 - Generation time
 - Doubling time
68. Phenolics control microorganisms by
- Denaturing proteins
 - Oxidising cellular components
 - Preventing cell wall formation
 - Inhibiting DNA replication
69. Which of the following binds to the small ribosomal subunit (30S) and interfere with protein synthesis by causing misreading of the mRNA?
- Macrolides
 - Aminoglycosides
 - Lincosamides
 - Quinolones
70. Which is an example of a biopolymer?
- Scleroglucan
 - Aconitase
 - Lyase
 - Phenyl acetic acid
71. Which is true regarding a cosmid vector?
- Plaques are not produced
 - Use lac selection system
 - Can carry small DNA fragments
 - Uses lambda origin of replication
72. The most important use of BAC vector is for
- Stable transfection
 - Human genomic library construction
 - E. coli* protein expression
 - E. coli* genomic library construction
73. Creating mutant protein with novel characteristics and properties is called
- Cloning
 - Mutagenesis
 - Sequencing
 - Protein engineering
74. The mismatch repair system of *E. coli* is
- Prnly directed repair system
 - Cysteine directed system
 - Mutated system
 - Methyl directed system
75. Which is not true for karyotyping?
- used to determine chromosome number
 - used to determine chromosome size
 - used in DNA amplification
 - used to detect diseases
76. Pyrolysis mass spectroscopy is used to differentiate organisms to _____ level
- Phyla and kingdom
 - Genus and species
 - Kingdom and species
 - Kingdom and Genus

77. Which of the following methods can be used to detect single nucleotide change in DNA?
- ELISA
 - WESTERN Blotting
 - SDS-PAGE
 - PCR
78. Why is enhancer region included in many vectors based on alphaviruses?
- Expression of protein in N terminus
 - Expression of protein on P terminus
 - Expression as fusion protein
 - To decrease the expression
79. All these statements are true regarding RFLP and RAPD except
- RAPD is quicker when compared to RFLP
 - RFLP is more reliable than RAPD
 - Species specific primers are required for RAPD
 - Radioactive probes are not used in RAPD
80. The variation in the number of tandem repeats between two or more individuals is called
- Variable number of tandem repeats (VNTRs)
 - Restriction fragment length polymorphism (RFLP)
 - Simple sequence repeats (SSRs)
 - Amplified fragment length polymorphism (AFLP)
81. Which of the following transcription factor is said to be a master switch of immune system, that promotes the cytokine expression during inflammation?
- Nuclear factor kappa B
 - Transcription factor II
 - DNA transcriptase
 - RNA transcriptase
82. Which of the following is the opsonin?
- C5b
 - C1q
 - C3a
 - C3b
83. Which of the following is the suppressive cytokine?
- IL-1
 - IL-2
 - IL-10
 - IL-12
84. Which of the following is NOT a mechanism of action of cyclosporine leading to immunosuppression
- Inhibition of transcription of IL-2 gene
 - Inhibition of Calcineurin pathway
 - Inhibition of Cytochrome P450 3A4
 - Inhibition of dephosphorylation of NF-AT
85. Which of the following drug is used to prevent graft rejection?
- Azathioprine
 - Methotrexate
 - Rapamycin
 - Tacrolimus
86. BCG vaccine contain non virulent strain of
- Bacillus subtilis*
 - Bacillus Pumilus*
 - Mycobacteriumleprae*
 - Mycobacterium bovis*
87. Which of the following methods is correct for producing vector vaccines?
- By inserting genes for antigens of a pathogen into a nonpathogenic viral vector
 - By inserting attenuated antigen to the pathogenic virus
 - By inserting whole antigen to the pathogenic virus
 - By inserting the antigenic component to host
88. Which of the following enzymes plays a vital role in the pathogenesis of HIV infection?
- RNA polymerase
 - RNA polymerase II
 - Tag polymerase
 - Reverse Transcriptase

89. When in skin allograft, second set of rejection occurs?
- 10-14 days
 - 5-7 days
 - After a month
 - After a week
90. What are passenger cells in transplantation?
- Donor leukocytes in graft tissue
 - Recipient leukocytes around graft tissue
 - Recipient dendritic cells
 - Recipient T cells
91. A data mining method especially for studying biological networks based on pairwise correlations between variables is:
- Hidden markov model
 - Convolutated network analysis
 - Artificial neural networks
 - Weighted correlation network analysis
92. The preference for the 20 standard amino acid residue types at each position in a given multiple sequence alignment refers to the:
- Pattern
 - Profile
 - Motif
 - Feature
93. What is the approximate time taken in dynamic programming for the alignment of 3 sequences of length n ?
- $5n^3$
 - $6n^3$
 - $7n^3$
 - $8n^3$
94. Which of the following models assumes constant rates of evolution with two substitution types?
- Jukes cantor model
 - Kimura Model
 - BLOSUM model
 - PAM model
95. The machine learning model associated with supervised learning is:
- Support vector machine
 - K-mean clustering
 - Principle Component analysis
 - Independent Component analysis
96. The concept of DNA computing was kick-started by the famous scientist
- Craig Venter
 - Margarette Dayhoff
 - Saul Needleman
 - Len Adleman
97. The phylogenetic tree following the principles of occam's razor is
- Maximum likelihood tree
 - Ultrametric tree
 - Additive tree
 - Maximum parsimony tree
98. In a microarray experiment, the typical p value for a reliable analysis of differentially gene expression is
- 0.05
 - 0.1
 - 1.0
 - 1.5
99. The term T2T-CHM13 refers to
- Recently sequenced Human genome
 - A new docking algorithm
 - A structure prediction method
 - A phylogenetic software
100. Similarity due to parallel evolution, convergent evolution or secondary loss is called
- Homoplasy
 - Homology
 - Heteroplasy
 - Heterogenecy