

1. 'Ks' in Monod equation stands for:
A) Substrate utilization coefficient
B) Coefficient of specific growth
C) Substrate saturation constant
D) Substrate affinity constant
2. Single step purification of protein can be attained through:
A) Dialysis
B) Gel filtration
C) Molecular weight cut off filters
D) Affinity chromatography
3. Ion exchange chromatography precisely focus on:
A) Size of the protein
B) Shape of the protein
C) Iso electric pH of the protein
D) Concentration of the protein
4. Divalent cations in the medium must be removed for the fermentative production of:
A) Glutamic acid B) Lysine
C) Citric Acid D) Lactic acid
5. The bacteria which is extensively reported for alcohol production:
A) *Pseudomonas putida* B) *Bacillus subtilis*
C) *Proteus vulgaris* D) *Zymomonas mobilis*
6. 'Cider' is prepared from:
A) Starch B) Pineapple C) Apple D) Grapes
7. ----- is a 'hard cheese':
A) Cheddar B) Gorgonzola C) Camembert D) Cottage
8. Sauerkraut is prepared from:
A) Butter B) Buttermilk C) Cabbage D) Maize
9. Which one of the following is polysaccharide with a pentasaccharide repeating unit of glucose, mannose, glucaronic acid and acetyl substituents?
A) Alginate B) Xanthan C) Gelatin D) Pullulan
10. Organs of different species that are related to each other by common descent are called as
A) analogous B) homologous C) homozygous D) phenocopies
11. A palaeontologist discovered an intact specimen of an herbivorous dinosaur preserved in coal tar. He analysed the stomach content of the animal to understand its diet. Which among the following will be most probably absent in the stomach contents?
A) Tree ferns B) Bamboos C) Pinus D) Cycas

12. How many phosphodiester bonds on an average will be present in a double stranded DNA strand of 68nm length?
 A) 100 B) 200 C) 400 D) 800
13. A metal mirror produced in Aranmula alone can be branded and marketed as 'AranmulaKannadi'. This kind of IPR is:
 A) Copy right B) Patent
 C) Geographical indication D) Traditional Knowledge
14. Which of the following species falls under the category of hydrogen producing bacteria?
 A) *Thiobacillusthiooxidans* B) *Nitrobacter winogradskyi*
 C) *Alkaligeneseutrophus* D) *Nitrosomonaseuropaea*
15. Identify the sterilisation technique for 50% glycerol:
 A) Autoclaving B) Filtration C) Irradiation D) Hot air oven
16. ----- is NOT a selective media.
 A) Blood agar B) Eosin methylene blue agar
 C) MacConkey agar D) Mannitol salt agar
17. All the following are lactose fermenting bacteria, **except**:
 A) *Klebsiella pneumonia* B) *Pseudomonas aeruginosa*
 C) *Enterobacter aerogenes* D) *Escherichia coli*
18. Which of the given bacteria has flagella and shows positive motility test?
 A) *Staphylococcus aureus* B) *Yersinia pestis*
 C) *Proteus vulgaris* D) *Klebsiella pneumoniae*
19. Benzylpenicillin is the chemical name for which of the following penicillin?
 A) Penicillin V B) Penicillin F
 C) Phenethicilin D) Penicillin G
20. ----- inhibits protein synthesis by combining with the 50S subunit ribosome.
 A) Streptomycin B) Tetracycline
 C) Chloramphenicol D) Penicillin
21. Which of the following suits well with antigenic competition?
 A) Involves competition between T-cell epitopes for the MHC groove.
 B) Involves competition for available soluble antibodies.
 C) Is unrelated to the concept of dominant and subdominant epitopes.
 D) Can only occur with cryptic epitopes.
22. RAG-1 and RAG-2 enzymes effect the recombination of:
 A) V(D)J to CH B) H to L
 C) V (D)J D) VJ to CI
23. Mendelian susceptibility to mycobacterial infection does not involve the gene for:
 A) IFN γ R1. B) IL-12 p40. C) MEFV. D) IL-12R β 1.

24. Which is the first of the following genes to be upregulated after T-cell activation?
 A) Transferrin receptor B) c-myc
 C) VLA-1 D) Cytokine receptor
25. What is a semi-synthetic drug?
 A) A drug isolated from nature and used without any further modification
 B) A drug made entirely in a lab from scratch
 C) The structure of a drug half way through its preparation
 D) A drug which has been part made by nature and part made in a lab
26. How many different pollen genotypes are produced by F1 of the cross:
 AAbbCCDD x aaBBccdd
 A) 8 B) 16 C) 4 D) 32
27. If a rare recessive X-linked allele has a frequency of 0.04 among females, what will this allele frequency among males?
 A) 0.04 B) 0.0016 C) 0.2 D) 0.08
28. Thalidomide intake in the first trimester of pregnancy produces limbless children. The same condition has resulted from a mutation called phocomelia. Then thalidomide syndrome is called as a -----of phocomelia mutation
 A) Phenocopy B) Expressivity C) Genotype D) Phenotype
29. ----- results in creating new variation in a population.
 A) Mutation B) Genetic drift
 C) Gene flow D) Random mating
30. Which among the following produces 3' sticky ends?
 A) Pst I B) BamHI C) EcoRI D) HindIII
31. ----- is the cofactor of T4 DNA ligase.
 A) NAD B) FAD
 C) ATP D) no cofactor requirement
32. A Lambda replacement vector containing *red* and *gam* genes in the stuffer will need additionally which sequence for plaque formation after recombination
 A) Psi B) Theta C) Chi D) Tau
33. ----- is a co-dominant molecular marker.
 A) RAPD B) AFLP C) ISSR D) RFLP
34. ----- is the carbon source of MS medium.
 A) sucrose B) glucose C) mannitol D) sorbitol
35. The disadvantage(s) of using Lineweaver Burk plot:
 A) Compared to other plots, departure from linearity is less obvious
 B) Most points are found far to the right of y axis and large extrapolation is required to obtain Km and Vmax
 C) Both A and B are correct
 D) A is incorrect, but B is correct

36. Among the following, which factor influences the R_f value the most?
 A) Polarity of the solvent
 B) Concentration of the extract to be separated
 C) Temperature
 D) Run time
37. Iduronic acid, a constituent of heparin, is a stereoisomer of:
 A) Gluconic acid B) Glucaric acid
 C) Glucuronic acid D) Muramic acid
38. When a cell is incubated with ---- ATP synthesis increases.
 A) Tween 20 B) Oligomycin
 C) 2, 4, dinitrophenol D) None of these
39. In ATP synthase, two half channels that facilitates H⁺ ion shuttle are present in
 A) α₃β₃ hexamer B) γε stalk
 C) Subunit a D) Subunit c
40. Mechanism based inactivators of enzymes:
 A) Alters the mechanism of action of the enzyme
 B) Changes the inhibitor molecule to another species that strongly binds to the enzyme active site
 C) Binds to a site in the enzyme that is different from the active site
 D) None of these
41. A molecule involved in methyl group transfer reactions:
 A) S adenosyl methionine
 B) Adenosine tri phosphate
 C) 3'-phosphoadenosine 5'-phosphosulfate
 D) Pyridoxal phosphate
42. Bilirubin is formed from:
 A) Heme catabolism B) Cholesterol catabolism
 C) Protein degradation D) Bile acid catabolism
43. Match the following.
- | | |
|----------------|------------------------|
| a. Myosin | 1. Calcium |
| b. Troponin | 2. Myosin binding site |
| c. Tropomyosin | 3. ATP binding |
- A) a-2, b-1, c-3 B) a-3, b-2, c-1
 C) a-2, b-3, c-1 D) a-3, b-1, c-2
44. For each molecule of glucose, total input of ATP (or GTP) required for glycolysis and gluconeogenesis are:
 A) 2 and 4 respectively B) 4 and 6 respectively
 C) 4 each D) 2 and 6 respectively

45. Humulin insulin made from:
 A) Klebsiella pneumonia B) pseudomonas aeruginosa
 C) Streptomyces griseus D) Escherichia coli
46. Which among the following is true in relation to drug receptors ?
 A) All drugs act through specific receptors
 B) All drug receptors are located on the surface of the target cells
 C) Agonists induce a conformational change in the receptor
 D) Partial agonists have low affinity for the receptor
47. The therapeutic index of a drug is a measure of its:
 A) Safety B) Potency C) Efficacy D) Dose variability
48. Pharmacokinetics is:
 A) The study of carcinogenic activity of a new drug
 B) The study of biological and therapeutic effects of the drugs
 C) The method of development of new pharmacological agent
 D) The study of absorption, distribution, metabolism and excretion of drugs
49. A drug that binds to a cell receptor and causes a response is called:
 A) Agonist B) Antagonist
 C) Receptor blocker D) Synergist
50. The technology used to produce monoclonal antibodies:
 A) mass culture technology B) hybridoma technology
 C) suspension culture D) none of these
51. Natural humoral immune response against a pathogen leads to the production of :
 A) Polyclonal antibodies B) Monoclonal antibodies
 C) Macrophages D) None of these
52. The estimation of COD of an effluent does not include the use of
 A) Calcium chloride B) Mercuric sulphate
 C) Silver sulphate D) Potassium dichromate
53. ----- is a flocculation-based wastewater treatment method.
 A) Activated sludge
 B) Trickling filter
 C) Rotating biological contactor
 D) Fluidized bed reactor
54. ----- is not an aerobic treatment strategy.
 A) Composting B) Activated sludge system
 C) UASB D) RBC
55. Plasmid assisted molecular breeding is relevant to:
 A) Waste Water treatment B) Solid Waste treatment
 C) Biodegradation D) Food processing

65. When a peptide was treated with trypsin, the fragments obtained were proline, asp-lys, and ser-asp-trp-gly-arg. Treatment of the original peptide with fluoro, 2, 4 dinitrobenzene followed by acid hydrolysis yielded DNP-Asp. What is the sequence of the original peptide?
- A) Pro-ser-asp-trp-gly-arg-asp-lys
 B) Asp-lys-pro-ser-asp-trp-gly-arg
 C) Asp-lys-ser-asp-trp-gly-arg-pro
 D) Ser-asp-trp-gly-arg-asp-lys-pro
66. Proteases are extensively used in:
- A) Fruit juice clarification B) Detergent industry
 C) Pharmaceutical industry D) Medical diagnosis
67. Indirect continuous method of industrial sterilization involves:
- A) Autoclaving
 B) Alcohol treatment
 C) Perfect heat exchanging plates
 D) Ozone treatment
68. Polarographic electrodes are used in bioreactors to detect:
- A) Dissolved oxygen concentration of the medium
 B) Conductivity of the medium
 C) pH of the medium
 D) Dielectric constant of the medium
69. ----- is used as an ingredient in Penicillin production medium.
- A) Biotin B) Lactamase
 C) Phenyl acetic acid D) Vitamin B12
70. Terminator gene technology make use of:
- A) Cre- lox recombination
 B) Flp- frt recombination
 C) Lambda site-specific recombination
 D) Gateway cloning
71. Triploid plants:
 Statement 1. can be produced by culturing endosperms
 Statement 2. Triploid plants are seedless
- A) 1 is correct and 2 is wrong B) 1 is wrong and 2 is correct
 C) Both 1 and 2 are correct D) Both 1 and 2 are wrong
72. Alpha complementation is:
1. The principle of Blue-white colony selection
 2. Complementing a host mutant β - galactosidase
- A) 1 & 2 are correct, and 2 is the correct explanation of 1
 B) 1 & 2 are correct, but 2 is not the correct explanation of 1
 C) 1 is correct, and 2 is wrong
 D) 2 is correct, and 1 is wrong

73. Triparental mating is associated with:
 A) Both co integrate and Binary vector system of *Agrobacterium tumefaciens*
 B) Only Binary vector system of *Agrobacterium tumefaciens*
 C) Only co integrate system of *Agrobacterium tumefaciens*
 D) Bac to Bac cloning
74. Topocloning technology completes ligation in:
 A) 12 hours B) 1 hour C) 10 minutes D) Half an hour
75. E coli RNA polymerase core enzyme is:
 A) $\alpha\beta_2\beta'$ B) $\sigma\alpha_2\beta\beta'$ C) $\sigma\alpha\beta_2\beta'$ D) $\alpha^2\beta\beta'\omega$
76. Coupled transcription and translation is a feature of :
 A) Bacterial protein synthesis
 B) Algal Protein synthesis
 C) Angiosperm protein synthesis
 D) Fungal protein synthesis
77. A twelve-base single-stranded oligonucleotide primer has 3 adenines, 4 guanines, and 3 cytosines. Then calculate the annealing temperature of this primer:
 A) 38^0 C B) 48^0 C C) 45^0 C D) 50^0 C
78. Golden rice contains:
 A) Two genes from *Narcissus* and one gene from *Erwinia*
 B) One gene from *Narcissus* and two genes from *Erwinia*
 C) Three genes from *Narcissus* and one gene from *Erwinia*
 D) Three genes from *Erwinia* and one gene from *Narcissus*
79. Taq DNA polymerase is an error-prone polymerase because:
 Statement 1. It lacks 3' to 5' exonuclease activity
 Statement 2. It lacks proofreading
 A) Both 1 and 2 are correct, but they designate two properties
 B) Both 1 and 2 are correct, and 1 is the correct explanation of 2
 C) Both 1 and 2 are correct, but 1 is not the correct explanation of 2
 D) 1 is correct, and 2 is wrong
80. Match the following:
 a. deamination of adenine 1. Acridine orange
 b. deamination of cytosine 2. A-G transition
 c. DNA intercalating agent 3. G-A transition
 d. DNA cross linking agent 4. Nitrogen mustard
 A) a-4, b-3, c-2, d-1 B) a-3, b-2, c-4, d-1
 C) a-2, b-3, c-4, d-1 D) a-2, b-3, c-1, d-4
81. Xeroderma pigmentosum is a disease caused by defects in:
 A) Photo reactivation repair B) Recombination repair
 C) Nucleotide excision repair D) Mismatch repair

82. If plasmid X and plasmid Y belong to the same incompatibility group:
 Statement 1. Plasmid X and Plasmid Y cannot coexist within the same host
 Statement 2. Plasmid X and Plasmid Y share the same subset of replication proteins
- A) 1 is wrong and 2 is correct B) 1 is correct and 2 is wrong
 C) Both 1 and 2 are correct D) Both 1 and 2 are wrong
83. Match the following
- | | |
|----------------------------|------------------------------|
| a. fmet | 1. Joins exons |
| b. spliceosome | 2. Discontinuous message |
| c. Shine Dalgarno sequence | 3. First of many amino acids |
| d. pre-mRNA | 4. Locates start site |
- A) a-2, b-4, c-1, d-3 B) a-3, b-1, c-4, d-2
 C) a-4, b-1, c-3, d-2 D) a-4, b-3, c-2, d-1
84. The RNA world hypothesis is proposing that:
 A) RNA is both genetic material and catalyst
 B) RNA was catalyst only
 C) RNA formed from DNA
 D) RNA formed from proteins
85. Kingsnake is a non-poisonous snake showing mimicry by adopting the colouration of the poisonous coral snake to avoid predation. In a region where both coral snake and king snake coexist, Kingsnakes' colouration will be more like that of the coral snakes. But, in areas where coral snakes are few, the colouration of Kingsnakes will be more dissimilar. This kind of selection is called:
 A) Positive frequency-dependent selection
 B) Negative frequency-dependent selection
 C) Balanced polymorphism
 D) Diversifying selection
86. What is the maximum theoretical capacity of Lambda replacement vectors?
 A) 10 Kb B) 12 Kb C) 15 Kb D) 22 Kb
87. Gateway cloning is based on:
 A) Lambda *flp- frt* system
 B) Lambda *Cre- lox* system
 C) Lambda *att P- att B* recombination
 D) *Tn7* transposition
88. ----- is not a prion disease.
 A) Prader- Villi Disease
 B) Scrapie Disease
 C) Bovine Spongiform Encephalopathy
 D) Creutzfeldt- Jacob's Disease

98. The unit of correlation coefficient is:
 A) Same unit as that of the Data correlated
 B) Square of the unit of the Data correlated
 C) A mere number without any unit
 D) None of the above
99. Two coins are tossed twice. What is the chance that all four faces give heads?
 A) 1/8 B) 1 C) 1/4 D) 1/16
100. ----- is a likelihood-based tree building algorithm.
 A) UPGMA B) Neighbour Joining
 C) Maximum Parsimony D) Bayesian
101. ----- is not a multiple sequence alignment tool.
 A) MUSCLE B) BLAST C) CLUSTAL D) T-Coffee
102. ----- is the technique used for creating Dolly.
 A) Pronuclear microinjection B) cumulus cell nuclear transfer
 C) ES cell nuclear transfer D) Somatic cell nuclear transfer
103. Ethical principle of autonomy is used as an argument against
 A) Cloning B) Germline gene therapy
 C) Transgenic technology D) All of the above
104. An mRNA molecule has the following sequence
 5' AUGGCCAUGGC 3'. Then what is the sequence of the template strand:
 A) 5'TACCGGTACCG3' B) 5'ATGGCCATGGC3'
 C) 5'GCCATGGCCAT3' D) 5'TACCGGTACCG3'
105. Barr bodies:
 Statement 1. Are the result of facultative heterochromatisation
 Statement 2. Help in dosage compensation
 A) Both 1 and 2 are correct B) 1 is correct, and 2 is wrong
 C) 1 is wrong, and 2 is correct D) Both 1 and 2 are wrong
106. Which among the following is an apoptosis inhibitor?
 A) bcl-2 B) ced-9
 C) Both A and B D) None of these
107. The three amino acids involved in the activation of MPF to promote G2 to M transition are:
 A) Thr -161 dephosphorylated, Thr 14 and Tyr 15 phosphorylated
 B) Thr-161 phosphorylated, Thr 15 and Tyr 14 dephosphorylated
 C) Thr-161, Thr- 15, and Tyr 14 dephosphorylated
 D) Thr-161 phosphorylated, Thr 14 and Tyr 15 dephosphorylated

108. The anteroposterior structure determining maternal genes of *Drosophila* are:
- A) bicoid and hunchback for anterior structure and nanos and caudal for posterior structures
 - B) bicoid and hunchback for posterior structure and nanos and caudal for anterior structures
 - C) bicoid and caudal for anterior structure and nanos and hunchback for posterior structures
 - D) nanos and hunchback for anterior structure and bicoid and caudal for posterior structures
109. Which among the following is RNA-dependent DNA polymerase?
- A) Terminal Deoxy nucleotidyl transferase
 - B) Reverse Transcriptase
 - C) DNA polymerase I
 - D) Primase
110. ----- is the only switched-on gene in lysogenic Lambda.
- A) *cro* B) *int* C) *rec* D) *cI*
111. ----- is high throughput sequencing procedure.
- A) Illumina B) Sanger's
 - C) Maxam and Gilbert's D) None of these
112. ----- is a nucleic acid database.
- A) DDJB B) PIR C) Swiss-Prot D) MIPS
113. The earliest branching species in a phylogram is called:
- A) Taxa B) Ingroup C) Clade D) outgroup
114. ----- is not a criterion for patentability under Indian patent Act.
- A) Usefulness B) Novelty
 - C) Inventive step D) Industrial application
115. A centralised international patent application procedure was ensured by:
- A) TRIPS B) GATT C) PCT D) PPVFR
116. The biological entities which are nonpatentable according to Indian Patent Act?
- A) A new plasmid vector
 - B) A transgenic cellline
 - C) An extant plant variety
 - D) A protein produced by rDNA technology
117. The Indian patent act 2005 excluded patenting of:
- A) Living entities of natural origin
 - B) Living entities of artificial origin
 - C) The process of preparing a biological cell
 - D) All of the above

