Kerala SET

Previous Year Paper

(Biotechnology)

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A

24137 **120 MINUTES**

1. Which of the following is **not** true about type II restriction endonuclease?
   A) Here Clevage and Methylation are by different enzymes
   B) In this case the recognition sequence is asymmetric
   C) It cleaves within the recognition sequence
   D) It can't cleave at methylated sequences

2. Which of the following enzyme is a neoisoschizomer?
   A) SphI and BbuI B) Not1 and HindIII
   C) SmaI and XmaI D) Pst1 and Sma1

3. The endonuclease HaeIIIand Sau3A recognizes---- sequence.
   A) bi-nucleotide B) tetra-nucleotide
   C) hexa-nucleotide D) octa-nucleotide

4. The various steps for construction of libraries are:
   1. Fragmentation of DNA 2. Isolation of genomic DNA
   3. Amplification 4. Ligation and introduction to the host
   5. Vector preparation

   The correct order of construction of libraries is (In the order of starting to ending).

   A) 1, 2, 3, 4,5 B) 2, 1, 5, 4, 3 C) 2, 5, 1, 4, 3 D) 5, 2, 1, 3, 4

5. Choose the **incorrect** statement for oligo-dT cellulose.
   A) It is used for separation of polyadenylated mRNA from other species of RNA
   B) oligo-dT are covalently attached to the solid support via OH bonds
   C) A solution containing RNA is passed through the column
   D) Poly A tail attaches to the oligo-dT by ionic bonds

6. Luciferase genes are used as reporter gene for screening. Choose the correct statement for them:
   A) They are obtained from fire flies only
   B) The detection requires provision of substrate which produces light
   C) Enzymes such as beta-galactosidase requires substrate X-gluc to produce light
   D) Lucifearse genes are preferred over fluorescent proteins

7. Asymmetric PCR differs from Normal PCR in:
   A) Range of annealing temperature
   B) The amount of primer used
   C) Template concentration
   D) Using multiple primers

8. Which of the following is obtained via cDNA clones?
A) ESTs B) SSLPs C) STS D) All of these

9. GFP is one of a marker which is used for screening libraries in hosts other than E.coli. Choose the **incorrect** statement for GFP.
A) It stands for Green Fluorescent Protein
B) It is obtained from a bio-luminescent jellyfish and produces protein aequorin which emits blue light
C) The absorbed blue light produces green light which can be detected further
D) The blue light is produced because of binding of sodium ions

10. The common gene delivery system for in vivo gene therapy is:
A) Lipofection B) Biolistics
C) Adenoviral vectors D) Electroporation

11. Which among the following is a human amnion derived cell line?
A) HeLa B) WISH C) L D) MRC-5

12. Which of the following statements is **incorrect** for culture and maintenance of mammalian cells in vitro?
A) Transformed cell lines need an exogenous supply of serum for growth
B) The cells that are obtained directly from an organism is primary culture
C) Trypsin is added to cell culture dish to maintain cell viability and health
D) HEPES is generally used for pH balance in animal culture media

13. All the following statements regarding RFLP and RAPD are true **except:**
A) RAPD is a quick method compared to RFLP
B) RFLP is more reliable than RAPD
C) Species specific primers are required for RAPD
D) Radioactive probes are not required in RAPD

14. In plant tissue culture system, what is the function of elicitors?
A) Induce cell division and callus formation
B) Stimulate production of secondary metabolites
C) Induce the formation of somatic embyoids
D) Induce somaclonal variations

15. During recombinant insulin synthesis, the bond between insulin polypeptide and galactosidase can be removed by using:
A) Cyanogen bromide B) Chymotrypsin
C) Carboxy peptidase D) Amylase

16. Freedom II, the first virus resistant transgenic cropis a transgenic squash variety commercialised in 1995. It carries genes coding for:
A) Antiviral proteins B) Si RNA
C) Virus coat protein genes D) Virus late protein genes

17. Identify the correct statements on nitrogenase enzyme used for nitrogen fixation.
1. Nitrogenase mediated nitrogen fixation is an energetically expensive process.
2. The gene encoding Nitrogenase is under a constitutive promoter
3. Nitrogenase is highly sensitive to oxygen
4. Endogenous availability of cofactors of nitrogenase is very low.

A) 1&2 only B) 1& 3 only C) 2 & 3 only D) 2 & 4 only

18. Which type of therapy was introduced for the first time in 1990, on a 4 year old girl with ADA deficiency?
A) Immunotherapy B) Gene therapy
C) Neuromotor therapy D) Alderian therapy

19. The agent or toxin which requires registration with U.S. Department of Agriculture, Animal and Plant Health Inspection Service under the Agriculture Bioterrorism Protection Act :
A) 5.0 mg staphylococcal enterotoxin
B) The plasmid that expresses the protective antigen of Bacillus anthracis
C) Complete genetic code for Epstein barr virus
D) Escherichia coli live culture, which produces Shiga-like toxin

20. The approximate respiratory ID50 (number of organisms required to produce infection in half of individuals exposed) for Mycobacterium tuberculosis is fewer than -----.
A) 10 B) 100 C) 1,000 D) 10,000

21. If $(1 + i)\ (x + iy) = 2 + 4i$, then *5x* is equal to:
A) 11 B) 13 C) 14 D) 15

22. If every observation in a data set is increased by a constant quantity then the coefficient of variation (C V) of the resulting set of values, will be:
A) Less than c.v of the original data set
B) Greater than c.v of the original data set
C) Equal to c.v of the original data set
D) Equal to c.v of the original data set plus the constant quantities

23. If the Cartesian product of two sets A & B, (AXB) = {(3,2), (3,4),(5,2), (5,4)}, then find set A
A) {3,2} B) {3,3} C) {3,4} D) {3,5}

24. In a series of 20 observations $\sum_{i=1}^{20}(xi - 7) = 20$. Then mean is equal to:
A) 7 B) 8 C) 9 D) 10

25. Which of the following statements is **incorrect** regarding trademark?
A) It may be word, signature, name, device, label, numerals or combination of colours
B) It prevents imitation of the offering
C) Registration of a trademark is mandatory in India
D) The term of registration is 10 years.

26. A baker is interested in whether there is a difference in the mean 'deliciousness' ratings that customers give to a low-sugar option of a cookie and to a high-sugar option of a cookie, and whether the difference in mean rating for the low- and high-sugar options depends on the age group of the customer (child vs. adult). What test should the baker use to examine this question?
A) two-sample t-test for a difference in means
B) one-factor analysis of variance (ANOVA)
C) two-factor analysis of variance (ANOVA)
D) chi-square test for independence

27. The first product that got Geographical Indication (GI) tag in India:
A) Katarni Rice B) Darjeeling Tea
C) Kashmir Saffron D) SanganeriHandblock print

28. When a string is used for numeral computations, perl converts it into:
A) character B) number
C) floating point number D) boolean value

29. Which among the following are closely associated with IPR?
A) TRIPs B) TRIMS C) GATS D) MFN

30. Company A produces 10%, Company B 20% and C 5% defective products. If choosing a company is an equally likely event, then find the probability that the product chosen is defective.
A) 0.11 B) 0.21 C) 0.22 D) 0.12

31. The extension for Windows sound file is:
A) .wav B) .sit C) .dif D) .wpd

32. The computer language is used for artificial intelligence:
A) COBOL B) C C) FORTRAN D) PROLOG

33. Reliefs in action for patent infringement are provided under section:
A) 111 B) 170 C) 108 D) 95

34. Which of the following is **not** a bioinformatics software?
A) AMPHORA B) EMBOSS C) PROSITE D) GRAIL

35. UGC-CARE has been set up for promoting
1. Quality research 2. Academic integrity
3. Publication ethics 4. Inclusion and access
5. International collaborative research

A) 1& 5 only B) 1,2 & 3 only C) 2,4 &5 only D) 1,2,3,4 & 5

36. Plagiarism in research is:
A) Creative use of previous data
B) Copying unscrupulously and making use of it
C) Quoting someone with citing the author
D) Referring to previous data and working with a new set of objectives

37. In how many different ways can the letters of the word 'DISPLAY' be arranged?
A) 1430 B) 5040 C) 4840 D) 3410

38. Identify the correct sequencing of the following steps that are involved in DNA fingerprinting:
1. Electrophoresis of DNA fragments 2. Hybridisation with DNA probe
3. Digestion with RE 4. Autoradiography
5. Blotting DNA fragments onto NCM

A) 3,1,2,5,4 B) 3,1,5,2,4 C) 1,5,3,2,4 D) 1,3,5,4,2

39. Dead zones in oceans refers to:
A) The Deepest zones such as Mariana Trench, where living organisms are not found.
B) Neritic zones, that are devoid of sunlight, at extreme end of continental shelf.
C) Hydrothermal vents, having extreme temperature.
D) Extremely hypoxic zones, due to substantial eutrophication

40. As per the Central Pollution Control Board norms, the maximum permissible limit of 3 days BOD at 27^0C in waste water effluent when discharged into an inland river or stream is ---- mg/L.
A) 100 B) 50 C) 30 D) 10

41. Which of the following is a secondary pollutant?
A) Carbon monoxide B) Smog
C) Fly ash D) Freon

42. Which of the following statements is true for trickling filter sludge?
A) It is more difficult to thicken (dewater) than activated sludge
B) It is bulky, with higher sludge volume index.
C) It has a comparatively low sludge volume index
D) It has a comparatively low sludge solid concentration.

43. Identify the **wrong** match:
A) Detergents – Lipase B) Textile – Amylase
C) Alcohol – Nitrogenase D) Fruit juice – Pectinase

44. Under the PFA rules, Toned milk should contain ---% Fat and --- % SNF.
A) 1.5, 9 B) 2, 7 C) 3 , 8.5 D) 4, 9.2

45. -----is a non-permitted food colour.
A) Tartrazine B) Brilliant blue
C) Ponceau D) Rhodamine

46. Name the bacterial spoilage causing organism in processed and cured meat products such as sausages, bacon, ham and canned meat.
A) Moraxella B) Alcaligenes
C) Lactobacillus sake D) Pseudomonas

47 Which of the following is a non biodegradable polymer?
A) PLA B) PHB C) PHBV D) LDPE

48. The enzyme used in tenderisation of meat:
A) Papain B) Pullulanase C) Pectinase D) Catalase

49. The art and science of etching, writing or printing at the microscopic level in the order of nanometer is:
A) NEMS B) Nanolithography
C) Nanofabrication D) Nanopaltcinins

50. In which of the following fermenters the impellers are replaced by the constant flow of gas?
A) Airlift fermenter B) Tower fermenter
C) Hollow fibre D) Perfusion bioreactor

51. The algorithm used in global alignment of nucleotide sequence:
A) Multialign B) nBLAST
C) Needleman Wunsch D) CLUSTAL Omega

52. The carbohydrates which are mainly present in whey:
A) Glucose B) Lactose C) Fructose D) Sucrose

53. The raw materials which are important for the industrial production of glutamic acid:
A) Glycerol B) Corn-steep liquor
C) Tryptone D) Biotin

54. Primo MAXX is a nano technology product, used for imparting stress tolerance to turfgrass. Name the company which developed Primo MAXX:
A) Mahyco B) Agrotech C) Syngenta D) Dhanuka

55. Which of the following organisms represent the natural living style as biofilms?
A) Bacteria B) Fungi C) Protozoa D) Algae

56. Which one of the following is a sedimentary type of biogeochemical cycle?
A) Carbon and Phosphorus B) Oxygen and Nitrogen
C) Nitrogen and Phosphorus D) Phosphorus and Sulphur

57. Fermentation of glycerol in wine results in:
A) Pousse B) Amertume
C) Mousy flavour D) Tourne

58. The TDT (Thermal Death Time Curve) is applicable for:
A) Autoclaving B) Export of seeds
C) Canning of food D) Pasteurisation of milk

59. The technique used to visualise the rapid lateral movement of membrane lipids in a lipid bilayer :
A) FACS B) MACS C) FRET D) FRAP

60. The cell organelle in which detoxification of xenobiotics takes place:
A) RER B) SER
C) Golgi vescicles D) Nucleolus

61. Neurofibrillary tangles (NFTs), found in the brain cells of patients with neurodegenerative diseases consists of :
A) Microfilaments B) Microtubule associated proteins
C) Microtubules D) Intermediate filaments

62. Sugar linked to the hydroxyl group of serine and threonine in O-linked glycosylation:
A) N-acetyl galactosamine B) Galactose
C) Mannose D) Sialic acid

63. A scientist induced a mutation on an ER-resident protein folding enzyme (PFE) that has lost its KDEL sequence (ER retention sequence). Which of the following combinations would be the most probable consequence of such a mutation?
1. PFE is exported to the extracellular space
2. PFE is degraded in the ER
3. Unfolded proteins increase in the ER
4. PFE is transported to the cytosol

A) 2 &3 only B) 1 &4 only C) 1 &3 only D) 3 &4 only

64. Hybrid dysgenesis is caused by which of the following transposable element?
A) IS element B) P-element
C) LINE D) Ac/ Ds element

65. A woman with a gene for haemophilia and a gene for colour blindness, on one of her X chromosomes, marries a normal man. How will their progenies become?
A) Hemophilic and colourblind daughters
B) All sons and daughers are hemophilic and colourblind
C) 50% hemophilic and colourblind sons and 50% normal sons
D) 50% hemophilic sons and 50% colourblind daughters

66. Which of the following ensure stable binding of RNA polymerase at the promoter site?
A) Rho factor B) Sigma factor
C) MCM proteins D) RecA proteins

67. How many calcium ions could be bound by calmodulin protein?
A) 9 B) 7 C) 5 D) 4

68. Arrange the following sequence of extracellular signalling in the correct order?
1. Transport of signal to a target
2. Start of signal transduction pathways
3. Signaling cell synthesize and release signaling molecules
4. Binding of the signal to the specific receptor

A) 2, 3, 4, 1 B) 3, 1, 4, 2 C) 1, 3, 4, 2 D) 1, 2, 3, 4

69. Human mitochondrial genome encodes for----rRNA genes.
A) 4 B) 3 C) 2 D) 1

70. Which of the following would cause the Hardy- Weinberg principle to be inaccurate?
A) The population size is very large
B) Individuals of the population mate in random
C) Natural selection is present
D) There is no source of new alleles from outside the population.

71. Which of the following about Rbtumor suppressor protein is correct?
A) It is activated when phosphorylated by Cdk
B) It binds E2F transcription factor and prevents cell from entering S phase until a mitogenic signal is received
C) It is a transcription factor
D) When a mitogenic signal is received, it binds the transcription factor E2F and thus stimulates the cell to enter S phase

72. The function of UvrC in NER mechanism is:
A) to identify and locate lesions in DNA
B) to act as a helicase to unwind the site
C) to catalyse the incision at the 5' end of the lesion
D) to ligate the strands after repair

73. In Drosophila males there is complete linkage. What is the reason behind this?
A) The genes are very closely located
B) Lack synapsis
C) Coupling theory
D) Unknown reason

74. Chiasmata are first seen in:
A) Pachytene B) Diplotene C) Zygotene D) Leptotene

75. At the end of each phase of cell cycle cyclins activating Cdks in that phase are inactivated irreversibly by:
A) Multiple phosphorylations
B) De-phosphorylation
C) Ubiquitinylation
D) Destabilizing by proteolysis in a proteosome

76. Prenylation adds prenyl groups to the----- amino acid residues.
A) Methionine B) Cystine C) Threonine D) Arginine

77. Which of the following inactivates the 60S subunit of eukaryotic ribosomes?
A) Chloramphenicol B) Cycloheximide
C) Diphtheria toxin D) Ricin

78. The type of topoisomerases that can introduce negative supercoils is:
A) Type I B) Type II C) Type III D) Type IV

79. Which of the following are reducing sugars?
1. sucrose 2. Ribose 3. Lactose 4. Fructose

A) 1 & 2 only B) 2,3 &4 only C) 3 & 4 only D) 1, 2, 3 & 4

80. A molecule of amylopectin which contains 1200 glucose residues and is branched after every 40 residues. How many reducing ends are there?
A) 0 B) 1 C) 2 D) 5

81. For a protein with 100 amino acids, how many possible sequences are there?
A) $(100)^{20}$ B) $(2)^{100}$ C) $(100)^{2}$ D) $(20)^{100}$

82. Which of the following is involved in pentose phosphate pathway?
A) Glucose 6-phosphate dehydrogenase
B) Acyl co-A glycerol transferases
C) PFK-2/FBPase-2
D) Pyruvate dehydrogenase

83. The lipid which act as lungs surfactants:
A) Ceramide B) Phosphatidylethanolamine
C) Phosphatidylcholine D) Phosphatidylinositol

84. Nitrogen atoms in urea produced in the urea cycle are contributed by:
A) Ammonia and aspartic acid
B) Nitrate and asparagine
C) Nitrite and ammonia
D) Ammonia only

85. The outcome of the accumulation of acetyl-CoA in the mitochondria of the liver:
A) It is used as an energy source
B) It has broken down in to free fatty acids
C) It gets converted to oxaloacetate
D) It forms ketone bodies

86. Which of the following are the principle laws of photochemistry?
A) Grothus-Draper and Stark-Einstein law
B) Raoult's and Dalton's law
C) Raoult's and Henry's law
D) Lambert's and Beer's law

87. Which of the following has the highest permeability in a resting nerve cell?
A) Na^+ B) Cl^- C) I^- D) K^+

88. Which of the following is based on rearrangement of Lineweaver Burk plot equation by multiplication of [So] factor?
A) Hanes plot equation
B) Eadie-Hofstee plot equation
C) MiachelisMenten equation
D) Eisenthal and Cornish and Bowden plot equation

89. The natural source of Bromelain, a cysteine endopeptidase is:
A) Apple B) Fig C) Pineapple D) Tamarind

90. The immobilized enzyme used in the large scale production of high fructose corn syrup:
A) Glucose isomerise B) Aspartate 4-decarboxylase
C) Hydantoinase D) Invertase

91. The G-protein coupled receptor Rhodospin is composed of a transmembraneapoproteinopsin and -----.
A) 11-cis-retinal B) 10-cis-retinal
C) 11-trans-retinal D) 10-trans-retinal

92. What is reduction potential?
A) The molecule loses an electron
B) An atom/molecule gains an electron
C) Reducing the power of an electron
D) Oxidation power of an electron

93. What is the unit of absorbance which can be derived from Beer Lambert's law?
A) $L\ mol^{-1}\ cm^{-1}$ B) $L\ gm^{-1}\ cm^{-1}$ C) cm D) No unit

94. The Radioactive element that is most commonly detected in human body:
A) Potassium-40 B) Cobalt-60
C) Iodine-131 D) Plutonium-238

95. The technique in which the separation is based on net charge of the molecule:
A) Affinity chromatography B) Ion exchange chromatography
C) Isopycnic centrifugation D) Flow cytometry

96. The analytical methods which can be used to distinguish flavour compounds:
A) Hydrometry B) Near infrared spectroscopy
C) Polarimetry D) Gas chromatography

97. Lead levels in drinking water could be determined by:
A) IR B) HPLC C) GC-MS D) AAS

98. For constructing the glucose biosensor, which of the following is used as a gel?
A) Urea B) Urease C) Acrylamide D) Polyacrylamide

99. What is the mechanism of action of Polymyxins for inhibiting the growth of the microbes?
A) Inhibition of cell-wall synthesis
B) Disrupting cytoplasmic membrane
C) Inhibition of nucleic acid and protein synthesis
D) Inhibition of specific catalytic enzymes

100. Identify the correct statements:
1. Definition of biological species was given by Ernst Mayr
2. Photoperiod does not affect reproduction in plants
3. Binomial nomenclature system was forwarded by Whittaker
4. In unicellular organisms, reproduction is synonymous with growth.

A) 2 & 3 only B) 3 & 4 only C) 1 & 4 only D) 1 & 2 only

101. The Tol plasmid codes for:
A) Tumour induction on plants crown
B) Antibiotic Methylenomycin biosynthesis
C) Root nodulation in leguminous plants
D) The degradation of Toluene

102. Which of the following is an example of commensalism?
A) A virus infecting a host and causing disease
B) A fungus growing on a dead tree
C) A bacterium living in the human gut and providing beneficial nutrients
D) A herbivore eating plants for food

103. Name the part of processed antigen that binds to the MHC molecule and recognized by T-cells:
A) Immunoglobulin B) Agretope
C) Epitope D) Chaperone

104. The chromosomal alteration which causes retinoblastoma:
A) Deletion in chromosome 11
B) Translocation between chromosome 9 and 22
C) Deletion in chromosome 13
D) Translocation between chromosome 8 and 21

105. Which of the following statement is INCORRECT about superantigens?
A) Viral or bacterial proteins B) Endogenous by nature
C) Unique binding ability D) Activate a large number of T-cells

106. The first recombinant vaccine produced targeted the surface antigen of:
A) Corona virus B) Ebola virus
C) DENV1 D) Hepatitis B virus

107. An 'orphan drug' is"
A) A very cheap drug
B) A drug which has no therapeutic use
C) A drug which acts on orphan receptors
D) A drug needed for treatment or prevention of a rare disease

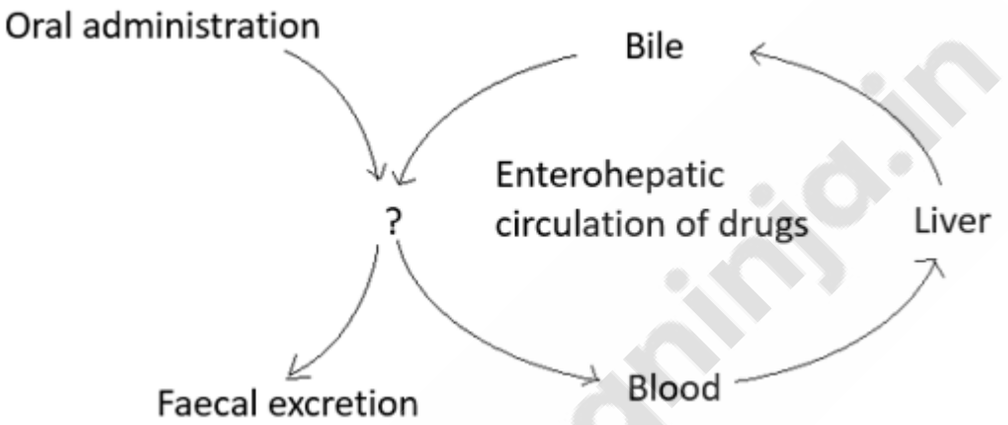
108. Which of the following is incapable of stimulating an immune response unless they are bound to a larger molecule?
A) Hapten B) Miligen C) Ribozyme D) Fusogen

109. Identify the polysaccharide vaccine:
A) Hep A B) Salk C) Antirabies D) Hib

110. The drug which is obtained from leaves:
A) Emetine B) Digitoxin C) Vinblastine D) Tubocurarine

111. Gray baby syndrome is characterised by circulatory collapse due to excessively high serum levels of:
A) Blood clotting factor VIII B) Creatinine
C) Chloramphenicol D) UDP- glucuronyltransferase

112. In the following diagram which organ name should be in the place of '?'?



A) Small intestine B) Large intestine
C) Kidney D) Pancreas

113. What is meant by ADME in pharmacokinetics?
A) Affinity, dosage, marketing, efficacy
B) Agonism, dependence, mobility, efficiency
C) Absorption, distribution, metabolism, excretion
D) Absorption, deficiency, mean, efflux

114. The term used to signify a preparation that appears identical to the preparation of an active drug but which has no biological activity?
A) Dummy drug B) Placebo
C) Peptidomemetic D) Gazebo

115. In 3D QSAR, yellow regions indicate favourable points for ----- groups.
A) Bulky B) Smaller
C) Electron rich D) Electron deficient

116. The functional food which improves gastrointestinal health as well as calcium absorption?
A) PUFA B) Daidzein
C) Fructo oligosaccharides D) Sterols

117. If $log_8 x = \frac{2}{3}$, then he value of x is:

A) $\frac{3}{4}$ B) 3 C) 4 D) $\frac{4}{3}$

118. An induced fit is the process by which:

A) A binding site alters shape such that it is ready to accept a drug
B) Binding of a drug to a binding site alters the shape of the binding site
C) A drug adopts the correct binding conformation before entering a binding site
D) A binding site alters the shape of the drug into the binding conformation before binding

119. The drug which inhibit platelet aggregation by inhibiting the enzyme cycloxygenase and formation of thromboxane A2 ?

A) Aspirin B) Abciximab C) Clopidogrel D) Warfarin

120. Identify the second generation thrombolytic drug:

A) Urokinase B) Alteplase C) Retavase D) Tenecteplase
