A

24737 **120 MINUTES**

1. The energy value of biogas is typically:
   A) 1000BTU/ft3 B) 400-700BTU/ft3
   C) 1500BTU/ft3 D) More than 5000BTU/ft3

2. The excess of which following compound in the drinking water cause 'blue babies'
   A) SO_4 B) CO_2 C) NO_3^- D) NH_4^+

3. Which one of the following is **not** an algorithm for building phylogenetic trees?
   A) Maximum parsimony B) Neighbor joining
   C) Maximum likelihood D) Bootstrap

4. The eukaryotic RNA polymerase which are insensitive to amanitin:
   A) RNA pol III B) RNA pol I C) RNA pol II D) All of these

5. Which among the following is **not** a part of regulatory frame work of recombinant DNA research?
   A) GEAC B) RDAC C) IBSC D) IAEC

6. The technology to cleanup the pollution generated by other technology is called---- technology.
   A) Front of the pipe B) End of the pipe
   C) Removal D) Cleaner

7. Identify the correct statement:
   A) COD is always higher than BOD
   B) Level of both depend on pollution
   C) BOD is always higher than COD
   D) None of the statement is correct

8. Name the component in the milk as an excellent emulsifying agent:
   A) Casein B) Gelatin C) Lactulose D) Saccharin

9. The microorganism which favors health benefits is called:
   A) Probiotic B) Antibiotic C) Prebiotic D) Adjuvant

10. Microorganisms indigenous to a given ecosystem are called:
    A) Autogenous B) Zymogenous
    C) Autochthonous D) Allochthonous

11. An aerobic method used for waste water treatment:
    A) Trickling filter B) USAB
    C) Septic Tank D) USSB

12. Method used for the analysis of GM food:
A) Enrichment Culture B) GC MS
C) PCR D) FTIR

13. Origin of Bagel bread:
A) Japan B) China C) Korea D) Poland

14. Which among the following is biodegradable plastic?
A) Polystyrene B) PHA C) PVC D) Polyethylene

15. The organism which follows associative nitrogen fixation:
A) Azospirillum B) Rhizobium
C) Azotobacter D) Anabaena

16. The metal present in nitrogenase enzyme:
A) Mn B) Mo C) Cu D) Ni

17. Type of inhibition where the inhibitor binds to the enzyme whether or not the enzyme has already bound the substrate, but has a greater affinity for the substrate-bound enzyme or the free enzyme:
A) Competitive inhibition
B) Uncompetitive inhibition
C) Non-competitive inhibition
D) Mixed inhibition

18. The absorption maximum of a red-coloured solution may be in the range of:
A) 300-400 nm B) 400-500 nm
C) 500-600 nm D) 600-700 nm

19. Specific binding of the substrates to the active site of trypsin is facilitated by ---- residue in the specificity pocket.
A) Aspartic acid B) Tryptophan
C) Lysine D) Histidine

20. In solution, majority of fructose exist in:
A) α pyranose form B) β pyranose form
C) α furanose form D) β furanose form

21. Vanaspathi is formed from vegetable oils by:
A) Iodination B) Hydrogenation
C) Halogenation D) Acetylation

22. When [NADH]/[NAD+] ratio is high, which following metabolic pathway can take place?
A) Glycolysis B) Fatty acid oxidation
C) Lactic acid formation D) Kreb's cycle

23. A protein involved in electron transport:
A) Plastocyanin B) Cytochrome C
C) Ferredoxin D) All of these

24. Find out the enzyme which is **not** a part of multienzyme complex:
A) Alpha keto-glutarate dehydrogenase
B) Alcohol dehydrogenase
C) Pyruvate dehydrogenase
D) Enoyl reductase

25. At pH above isoelectric pH, the protein has:
A) Positive charge B) Negative charge
C) Neutral D) Can be positive or negative depending on the temperature

26. The solubility of fatty acid in water is reduced when:
A) The longer the fatty acyl chain and the fewer the double bonds
B) The longer the fatty acid chain and the more the double bond
C) The shorter the fatty acid and the more the double bond
D) The shorter the fatty acid and the fewer the double bond

27. Digestion of the stomach starts by the action of :
A) Saliva B) Gastric juice
C) Pancreatic juice D) Intestinal juice

28. The major type of glycoprotein in eukaryotes is:
A) O-linked glycoprotein B) N-linked glycoprotein
C) GPI-linked glycoprotein D) None of these

29. The functional units of muscle fibers are known as:
A) Sarcoma B) Sarcolemma
C) Sarcomeres D) Sarcoplasm

30. Two phosphatidic acids are present in:
A) Lecithin B) Dipalmitoyl lecithin
C) Cardiolipin D) Plasmalogens

31. An enzyme that catalyzes stereospecific isomerisation:
A) Phosphoglucoisomerase B) Bisphosphoglycerate mutase
C) Alanine racemase D) Aconitase

32. Isozymes differ in the:
A) Electrophoretic mobility B) Structure
C) Kinetic parameters D) All of these

33. One of the reasons for the high energy of hydrolysis of ATP is the:
A) ATP is the energy currency
B) Resonance stabilization of products
C) Low solvation energy of products
D) None of the above

34. Identify the correct statement about oxidases:
A) Perform their activity only in the absence of metal ions
B) Do not incorporate oxygen into the product
C) Incorporate one oxygen atom into the product
D) Incorporate two oxygen atoms into the product

35. Cholesterol lowering drugs such as statin hinders with the action of:
A) HGPRT enzyme B) HMG CoA reductase
C) HRP enzyme D) HMG CoA synthase

36. Synzymes can be developed by:
A) Designing and synthesizing enzyme mimicking structures
B) In vitro evolution
C) Molecular imprinting
D) All of the above

37. India is **not** a signatory of :
A) UPOV B) WIPO C) PCT D) GATT

38. What is the plant variety protection used in India?
A) Sui generis B) Plant patent C) Trade secret D) GURT

39. Assertion (A): The 11^{th} term of an AP is 7,9,11,13---is 67
Reason (R) : If S_n is the sum of first 'n' terms of an AP then its n^{th} term a_n is given by $a_n=S_n+S_{n-1}$

A) Both A and R are correct and R is the correct explanation of A
B) Both A and R are correct but R is not the correct explanation of A
C) Both A and R are incorrect
D) A is incorrect but R is correct

40. What is the meaning of the testing of the hypothesis?
A) It is a significant estimation of the problem
B) It is a rule for acceptance or rejection of the hypothesis of the research problem
C) It is a method of making a significant statement
D) None of the above

41. The ratio of the perpendicular and base of a right-angled triangle is called:
A) Cosine B) Sine
C) Tangent D) None of these

42. A man starts repaying a loan as first instalment of ₹ 100. If he increases the instalment by ₹ 5 every month, then the amount he will pay in the 30^{th} instalment is:
A) ₹241 B) ₹250 C) ₹245 D) ₹265

43. The points A (9, 0), B (9, 6), C (–9, 6) and D (–9, 0) are the vertices of a:
A) Square B) Rectangle C) Rhombus D) Trapezium

44. The method used for prediction of three-dimensional structure of a protein from known structure(s) of one or more related proteins is:
A) Multiple sequence alignment
B) Homology modeling
C) Phylogeny
D) Docking

45. Assertion (A) : If the value of mode and mean is 60 and 66 respectively, then the value of median is 64.
Reason (R): Median = (mode + 2 mean)/2

A) Both A and R are correct and R is the correct explanation of A
B) Both A and R are correct but R is not the correct explanation of A
C) A is correct but R is incorrect
D) A is incorrect but R is correct

46. The data type which is supported in C++ but **not** in C?
A) int B) bool C) double D) float

47. Which of the following techniques is an analysis of the relationship between two variables to help provide the prediction mechanism?
A) Standard error B) Correlation
C) Regression D) None of these

48. Which one of the following statements is **not** correct?
A) Bar diagram is an one dimensional diagram
B) The bars in a histogram touch each other
C) With the help of ogive curve one can determine percentiles
D) Both line diagram and pie-diagram are two dimensional diagrams

49. The computer understands only:
A) C Language B) Assembly Language
C) Binary Language D) BASIC Language

50. What percentage of the human genome was estimated to be protein-coding genes?
A) Approximately 50% B) Around 75%
C) Over 90% D) Less than 5%

51. If the mean and standard deviation of the series A and B are as, $\bar{X}_A = 15, \bar{X}_B = 20$ and $\sigma_A{}^2 = 25$ and $\sigma_B{}^2 = 16$, which of the two series is more consistent.

A) Series A and B are equally consistent
B) Series A
C) Series B
D) Data inadequate

52. The computational methodology that tries to find the best matching between two molecules, a receptor and ligand are called:

A) Molecular fitting B) Molecule affinity checking
C) Molecular matching D) Molecular docking

53. The operating system and the other processes are protected from being modified by an already running process because:

A) Every address generated by the CPU is being checked against the relocation and limit registers
B) They have a protection algorithm
C) They are in different memory spaces
D) They are in different logical addresses

54. What is the main function of heterocysts?

A) Phosphate solubilisation B) Survival during adverse conditions
C) Nitrogen fixation D) Toxin production

55. Identify the **incorrect** statement about episomes:

A) They occur in bacteria and eukaryotes
B) They can't replicate independently
C) They can integrate into host chromosome
D) They can replicate as part of host chromosome

56. Blood agar is:

A) An enrichment medium B) An enriched indicator
C) A selective medium D) A transport medium

57. Mac Intosh -Fildes's jar is used for:

A) Aerobic incubation
B) Microaerophilic incubation
C) Incubation in the presence of carbon dioxide
D) Anaerobic incubation

58. Volutin granule consists of:

A) Lipid B) Polypeptide
C) Polysaccharide D) Polymetaphosphate

59. Which of the following is **not** sterilized by moist heat methods?
A) Distilled water B) Normal saline
C) Liquid paraffin D) Robertson cooked meat medium

60. The antibacterial activity of a disinfectant is determined by:
A) Elek's test B) Dick test
C) Rideal-walker test D) Germ tube test

61. Immunity obtained by serum therapy is an example of ----- immunity.
A) Natural passive B) Artificial passive
C) Natural active D) Artificial active

62. Which of the following immunoglobulin classes can cross the placenta?
A) IgG B) IgA C) IgM D) IgD

63. Identify the correct statement about IgM:
A) It is present in mucous linings and offers local immunity
B) It is the immunoglobulin class present in the largest concentration in serum
C) It is the largest immunoglobulin molecule
D) It has a critical role in the pathogenesis of atopy

64. Oudin procedure is:
A) Single diffusion in one dimension
B) Double diffusion in one dimension
C) Single diffusion in two dimensions
D) Double diffusion in two dimensions

65. Which of the following is single radial immunodiffusion?
A) Oudin procedure
B) Oakley Fulthorpe procedure
C) Ouchterlony immunodiffusion
D) Mancini technique

66. Which of the following is a dimeric molecule?
A) IgA B) IgM C) IgD D) IgE

67. An example of non-professional antigen presenting cell:
A) Thymic epithelial cell B) Dendritic cell
C) B cell D) Macrophages

68. The disease characterized by development of autoantibodies against TSH:
A) Di George syndrome B) Addison's disease
C) Crohn's disease D) Graves disease

69. An example of antagonistic drug:
A) Heroin B) Methadone C) Naltrexone D) Oxycodone

70. The hepatitis B vaccine is:
A) Live attenuated B) Conjugate vaccine
C) Recombinant vaccine D) RNA vaccine

71. HAT medium is used in:
A) Hybridoma technology B) Disc diffusion test
C) Water analysis D) Disinfectant testing

72. Who among the following is known as the father of pharmacogenomics?
A) Jonathan Pereira B) Francis Collins
C) Gerhard Levy D) Arno Motulsky

73. Which of the following is produced via recombinant DNA technology in Chinese hamster ovary cells?
A) Humulin B) Alteplase
C) Hepatitis B vaccine D) Human growth hormone

74. Maximum capacity of a Lambda phage vector is
A) 24 kb for lambda replacement vector
B) 18 kb for lambda insertional vector
C) 32 kb for lambda replacement vector
D) 20 kb for lambda insertional vector

75. Spi selection recombinant lambda phage vectors have which of the features?
A) Presence of *red* gene B) Presence of *gam* gene
C) Presence of *Chi* site D) Absence of *Chi* site

76. Which among the following is true about the CI repressor protein?
A) It is the only lambda protein synthesised during lytic cycle
B) If CI repressor protein is inactivated lambda will form Clear plaques
C) If CI repressor protein is inactivated lambda will form turbid plaques
D) High frequency lysogenisation is prevented by CI repressor protein

77. The vector which has the highest capacity:
A) Bacmid B) Phagemid C) Phasmid D) Cosmid

78. Heterohypkomeres are pair of restriction enzymes:
A) Differing in recognition sites
B) Same recognition site but digest at different positions
C) Differing in methylation sensitivity
D) Different recognition site but produce same termini

79. Identify the statement true about topocloning?
A) Complete ligation in 5 minutes at 37^0 C
B) Require a 5' phosphate for phosphodiester bond formation
C) Topocloning is not a site-specific reaction
D) Protocol requires a 16^0 C water bath for incubation

80. Which among the following is true about nucleic acid hybridisation?
A) Excess NaCl decreases stringency
B) Excess NaCl destabilizes H bonds
C) High temperature decreases stringency
D) Formamide stabilizes H bonds

81. Labelled probes with high specific activity can be made by:
A) Nick translation and Random priming
B) Nick translation and End labelling
C) Random priming and End labelling
D) End labelling and in vitro transcription

82. Statement 1: pET vector is a low copy number plasmid vector
Statement 2: pET vector has a Rop gene

A) Both 1 &2 are correct and 2 is the correct explanation of 1
B) Both 1 & 2 are wrong
C) Both 1 & 2 are correct but they are unrelated statements
D) 1 is correct but 2 is wrong

83. Statement 1: T/A cloning is best suited for Taq amplicons
Statement 2: Taq polymerase ends of has limited terminal transferase activity adding A residue at 3' end of amplicons

A) Both 1 &2 are correct and 2 is the correct explanation of 1
B) Both 1 & 2 are wrong
C) Both 1 & 2 are correct but they are unrelated statements
D) 1 is correct but 2 is wrong

84. The Geographical Indication registry of India is situated at:
A) Chennai B) Kolkata C) Mumbai D) Delhi

85. Which among the following treaty is for the deposition of microorganisms for patent purposes?
A) Helsinki Accord B) Budapest Treaty
C) TRIPS D) Patent Co-operation Treaty

86. Statement 1: pMUTIN is a vector incapable of replication in Bacillus
Statement 2: pMUTIN can be used for systematic insertional inactivation of Bacillus operons

A) Both 1 &2 are wrong
B) Both 1 &2 are correct and 2 is the correct explanation of 1
C) Both 1 & 2 are correct but they are unrelated statements
D) Both 1 & 2 are correct and 1 is the correct explanation of 2

87. Which among the following is an endogenous selectable marker gene?
A) Cad B) Gus A C) GFP D) Lux

88. Carnegie 20 is :
    A) A vector for bacteria
    B) Based on Ac Ds elements of maize
    C) Based on P elements of Drosophila
    D) A wings-clipped element

89. Muellarian mimicry is an example of:
    A) Positive frequency dependant selection
    B) Negative frequency dependant selection
    C) Disruptive selection
    D) Artificial selection

90. Which among the following is an example of convergent evolution?
    A) Australian marsupials
    B) New world Crane Hawk and old-world harrier Hawks
    C) Two species of African elephants
    D) All of the above

91. Which among the following is an example of library screening thorough functional complementation?
    A) Identification of yeast his B genes in auxotrophic E coli
    B) Identification of mammalian transcription factors by using knockout yeast strains
    C) Identification of DFNB3 (deafness gene) from shaker 2 mouse
    D) All of the above

92. Identify the **wrong** statement:
    A) Oligocapping is a procedure for fulllength cDNA cloning
    B) CAPture method is a procedure for fulllength cDNA cloning
    C) Oligocapping solves the problem of mispriming in cDNA synthesis
    D) CAPture method solves the problem of mispriming in cDNA synthesis

93. Identify the correct statement:
    A) AFLP and RFLP are codominant markers
    B) Dominant markers are scored as present and absent states
    C) Dominant markers will identify heterozygotes
    D) RAPD is a PCR based codominant marker

94. Identify the correct statement:
    A) Serum free media are less prone to the contamination by infectious agents
    B) Serum containing media ensures reproducibility and product uniformity
    C) Cells used for transfection experiments are best grown in serum containing media
    D) All of the above

95. Match the following:

List I	List II
a. EST	1. Codominant
b. STS	2. Selectable marker
c. ISSR	3. cDNA
d. Bar gene	4. Dominant

A) a-2, b-1, c-4, d-3 B) a-3, b-1, c-4, d-2
C) a-4, b-3, c-2, d-1 D) a-4, b-3, c-1, d-2

96. Which among the following is solely a feature of a eukaryotic cell?
A) Mesosomes B) Polysomes C) Cell wall D) Mitochondria

97. Lichens are:
A) Fungus and algal association
B) Fungus and bacterial associations
C) Algae
D) Fungi

98. Higher plants possess Chlorophyll -----.
A) a and b B) b and c C) a and c D) d and c

99. First stable compound in Hatch and Slack pathway is:
A) 3 phospho-glyceric acid B) Ribulose bisphospate
C) Oxaloacetate D) Phospho enol pyruvate

100. How many different gametes are produced by an individual with a genotype AaBbCcDdEe
A) 32 B) 64 C) 8 D) 16

101. A rare sex-linked inheritance has a frequency of 0.01 among males. Calculate the frequency of female carriers for the trait?
A) 0.01 B) 0.0001 C) 0.02 D) 0.99

102. Which among the following statements are **not** true about geneic mapping?
A) Genetic map is an arbitrary mapping
B) Genetic map uses relative distances
C) The cM distances translated to basepair distance will be same for all species
D) Genetic mapping is performed with 3-point test crosses

103. The pubescence (hairiness) of the leaf sheath in Avena fatua is controlled by a single locus with two alleles, written L and l. The frequencies of genotypes in one population were LL 60%, Ll 8 %, ll 32 %. Calculate the frequency of L allele in this population if the population is in HW equilibrium.
A) 64% B) 36% C) 60% D) 40%

104. Match the following:

List I	List II
a. Bicoid	1. Nanos
b. Caudal	2. Tyrosine kinase
c. Torso	3. Hunchback,
d. Gap genes	4. Zygotic genes

A) a-3, b-2, c-1, d-4 B) a-1, b-2, c-3, d-4
C) a-3, b-1, c-2, d-4 D) a-2, b-3, c-4, d-1

105. An individual carrying somatic cells of different genotypes from a common ancestral origin is called:
A) Mosaic B) Chimera C) Variegation D) Autopheny

106. Which among the following is a DNA crosslinking agent?
A) Psoralen B) Acridine orange
C) EMS D) Aflatoxin

107. Identify the group with only proto-oncogenes:
A) *c- myc, abl, RB1* B) *NF1, H Ras, sis*
C) *BRCA1, K Ras, jun* D) *src, myb, fms*

108. Which among the following PCR methodology is used for increasing specificity of amplification of related sequences?
A) Insitu PCR B) Inside PCR C) Nested PCR D) qRT PCR

109. Which among the following CRISPR system is best suited for genome editing applications?
A) Type I B) Type II C) Type III D) Type IV

110. Identify the true statement:
A) DNA pol I has 3’ to 5’ exonuclease activity
B) Klenow enzyme has 3’ to 5’ exonuclease activity
C) DNA pol III has 5’ to 3’ exonuclease activity
D) DNA pol II 5’ to 3’ exonuclease activity

111. Rho, Tau and nus A are involved in:
A) Replication B) Transcription
C) Translation D) Repair

112. Multiple embedded self splicing introns are called:
A) Class II B) Nuclear pre mRNA introns
C) tRNA introns D) Twintrons

113. The RNA editing mechanisms which involves cytidine deaminases?
A) Simple editing B) Pan editing
C) Insertional editing D) Polyadenylation editing

114. The activated G protein is:
A) Trimer made of α, β, γ B) Dimer made up of α, β
C) Dimer made up of β, γ D) Trimer made up of α, β, σ

115. SARS Covid virus has a:
A) Positive sense RNA genome
B) Negative Sense RNA genome
C) Single stranded DNA genome
D) Double stranded DNA genome

116. LongTaq is a combination of which of the following thermostable polymerases?
A) *Taq and Pfu* B) *Taq and Tth*
C) *Taq and Vent* D) *High efficiency Taq alone*

117. GateWay *cloning* system is based on:
A) P1 phage Cre lox recombination
B) Yeast Flp Frt recombination
C) Lambda phage attP attB recombination
D) None of the above

118. Which transgene is present in Bollgard III cotton?
A) EPSPS B) AHAS
C) Beta lactamase D) Vip3a

119. What is the role of $MgCl_2$ in PCR?
A) Act as a buffering agent
B) Protect nucleotides
C) Supply the cofactor for the polymerase
D) Form hydrogen bonds

120. Identify the wrong statement?
A) IPTG and XGal is needed for blue white screening of recombinants
B) Recombinants are white on IX plate
C) Non-recombinants are white on IX plate
D) Recombinants are unable to synthesise functional beta galactosidase