A

24135 **120 MINUTES**

1. If a colour blind lady marries a normal man, their children will be:
   A) All Daughters will be Colour blind and all sons will be carriers
   B) All Sons will be Colour blind and all daughters will be carrier
   C) Normal daughters and sons
   D) Normal sons and carrier daughters

2. What is the role of the "sense" strand in viral genome?
   A) It is the template for transcription of all viral genes. It serves as a template for viral RNA replication.
   B) It is the functional form of viral genome, which can be directly translated into viral proteins.
   C) It is the template for replication of viral genome
   D) It is the regulatory element that controls viral gene expression

3. Mature Erythrocytes do **not** contain:
   A) Glycolytic enzymes B) HMP shunt enzymes
   C) Pyridine nucleotide D) ATP

4. α-D-Glucuronic acid is present in:
   A) Hyaluronic acid B) glycoprotein
   C) Chondroitin sulphate D) Heparin

5. Enzymes which are produced in inactive form in the living cells are called:
   A) Lysozymes B) Apoenzymes C) Proenzymes D) Isozymes

6. Fisher's Lock and Key model of the enzyme action implies that:
   A) The active site is complementary in shape to that of substance only after interaction
   B) The active site is complementary in shape to that of substance
   C) Substrates change conformation prior to active site interaction
   D) The active site is flexible and adjusts to substrate

7. The causative agent of Hansen's disease is:
   A) *Mycobacterium leprae*
   B) *Mycobacterium tuberculosis*
   C) *Clostridium tetani*
   D) *Clostridium botulinum*

8. Elements important for photolysis of water:
   A) Manganese, Calcium and Chlorine
   B) Magnesium, chloride and Zinc
   C) Zinc and Magnesium
   D) Potassium and Zinc

9. The independent assortment which Mendel has proposed is actually:
   A) Law of Segregation B) Crossing over
   C) Linkage D) Law of inheritance

10. Number of linkage group in an organism is always equal to:
   A) Number of X chromosome
   B) Number of Y chromosome
   C) Number of barr bodies
   D) Haploid number of chromosome

11. Which of the following statement is TRUE about factors affecting crossing over?
   A) Chromosomal aberration
   B) Environmental factors which affect sex and age of female shown to affect rate of crossing over
   C) Genes located in the vicinity of the centromere shows a relatively lower recombination
   D) All of these

12. β – oxidation involves the activation of fatty acids in the presence of :
   A) Ca++ and thiokinase enzyme
   B) ATP and thiokinase enzyme
   C) ATP and β-ketoacylthiolase
   D) ATP and aldehyde dehydrogenase

13. Plasmalemma of bacteria contains:
   A) Hopanoids B) Cerebrosides
   C) Cholesterol D) All of these

14. The hydrolysis of fat is accelerated by the presence of which of the following ions?
   A) Mg^{2+} B) Fe^{2+} C) Na^{2+} D) Ca^{2+}

15. By glycolysis, one molecule of glucose is converted into two molecules of pyruvic acid with concomitant production of:
   A) One NADH + H^+ B) Two NADH + H^+
   C) Six NADH + H^+ D) 32 NADH + H^+

16. Gaucher's disease is associated with:
   A) Malnutrition
   B) Abnormal protein metabolism
   C) Abnormal carbohydrate metabolism
   D) Abnormal lipid metabolism

17. During translocation, the ribosomes move by the distance of one codon towards:
   A) 3' end of DNA B) 3' end of mRNA
   C) 5' end of mRNA D) None of these

18. Animals inhabiting colder regions are larger in body size.This phenomenon is related with:
A) Gloger's rule B) Jordan;s rule
C) Bergman's rule D) Allen's rule

19. Biological equilibrium is equilibrium among the:
A) Producers
B) Primary consumers
C) Producers, consumers and decomposers
D) Decomposers and producers

20. The Major pollutant behind famous Bhopal tragedy:
A) Hydrogen Cyanaide B) Isocyanic acid
C) Methylamine D) Methyl Isocynate

21. The main feature of the 'biological species concept' is its emphasis on the:
A) Role of sexual reproduction in maintaining diversity within species
B) Absence of gene flow between different species
C) Genetic variation within populations
D) Large morphological differences between different species

22. Which of the following is commonly called Portugese man of war?
A) Star fish B) Physalia C) Tubularia D) Hydra

23. The canal system is a complex network of water vessels that permeate a solid, spongy body:
A) Leuconoid type B) Syconoid type
C) Asconoid type D) None of these

24. The intermediate host of Gambian fever is:
A) *Glossina palpalis* B) *Glossinamorsitans*
C) *Trypanosomagambiense* D) *Trypanosomarhodesiense*

25. Pseudo segmentation is exhibited by the organisms such as:
A) Annelida B) Arthropoda
C) Platyhelminthes D) Porifera

26. Two opposite forces operate in the growth and development of every population. One of these is ability to reproduce at a given rate. The force opposite to it is called:
A) Environmental resistance B) Mortality
C) Biotic control D) Fecundity

27. The computational methodology that tries to find the best matching between two molecules, a receptor and ligand are called:
A) Molecular docking B) Molecular matching
C) Molecular fitting D) Molecule affinity checking

28. Proteomics refers to the study of:
A) Set of proteins
B) Biomolecules
C) The entire set of expressed proteins in the cell
D) Set of proteins in a specific region of the cell

29. Which of the following factor would lead to increased transcription of the lacoperon?
A) Increased availability of lactose
B) Increased availability of glucose
C) Binding of the lac repressor protein to the operator region
D) Binding of CAP to the CAP site

30. Exchange of chromosomal segments between non-homologous chromosomes is called:
A) Crossing over B) Duplication
C) Inversion D) Translocation

31. The enzyme involved in conversion of fructose-1,6- phosphate to fructose-6-bisphosphate:
A) Phosphofructokinase
B) Phosphoglycerate kinase
C) Fructose 1, 6-bisphosphatase
D) 6-phosphofructo-2-kinase

32. *Perna indica* belongs to the class:
A) Bivalvia B) Monoplacophora
C) Polyplacophora D) Scalphopoda

33. Which of the following statements are true about hypersensitivity?
1. Type III hypersensitivity is also called delayed type hypersensitivity
2. Type I hypersensitivity is mediated by IgE antibodies
3. Transfusion reactions and hemolytic disease of the new born are examples of Type II hypersensitivity.

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

34. Identify the **wrong** statement from the following:
A) Histone acetylation is associated with activation of gene expression
B) Active chromatin is acetylated on the tails of histones H3 and H4
C) Methylation of cytosine at CpG doublets is associated with gene inactivity
D) Imprinted genes are controlled by deacetylation of cis-acting sites.

35. Which of the following is a non-poisonous snake?
A) *Viperarusselli* B) *Enhydrinaschistosa*
C) *Bungarus coeruleus* D) *Eryx johni*

36. Cori's disease is due to the deficiency of:
A) α-1,4-glucosidase B) Amylo 1,6-glucosidase
C) Phosphorylase kinase D) Glucose-6-phosphatase

37. Peptidyl transferase activity resides exclusively in the:
A) 16S rRNA B) 5S rRNA C) 23S rRNA D) 5.8S rRNA

38. The tentaculocyst is found in:
A) Heteronereis B) Paramecium
C) Aurelia D) Starfish

39. The Ames test is used for:
A) Identification of antibiotic resistant bacteria
B) Identification of potential human carcinogens
C) Finding pathogenic microbes
D) Detection of nutritional mutants

40. Which of the following is commonly known as root-headed barnacle?
A) Limulus B) Scorpion C) Sacculina D) Nymphon

41. Four kingdom system of classification was proposed by:
A) R.H Whittaker
B) Carolus Linnaeus
C) Antonie Van Leeuwenhoek
D) Herbert F. Copeland

42. The role of cAMP in a cell is:
A) Remove phosphate group from enzymes
B) Add phosphate groups to enzymes
C) Activate protein kinases
D) Activate G-protein coupled receptors

43. CD8 marker is expressed on the surface of:
A) T helper cells B) Cytotoxic T cells
C) Suppressor T cells D) Regulatory T cells

44. The mode of secretion in Mammary gland is ---- secretion.
A) Apocrine B) Eccrine C) Holocrine D) Autocrine

45. The neurotransmitter which mediates pain transmission:
A) Epinephrine B) Substance P
C) β- endorphin D) Enkephalins

46. Which of the following statements are correct?
1. Alpha waves dominate the EEG when a person is awake and resting with the eyes closed
2. Beta waves are accentuated during mental activity and sensory stimulation
3. Adult exhibit delta waves when awake, and infants exhibit them in deep sleep

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

47. The primary role of Major Histocompatibility Complex molecules in the immune system is:
A) Activation of complement system
B) Killing of virus infected cells
C) Recognizing foreign antigens
D) Inhibition of immune response

48. Cortisol is secreted by:
A) Zona reticularis B) Zona fasciculata
C) Zona glomerulosa D) Zona maculate

49. The hormone which is involved in iron homeostasis:
A) Angiotensin II B) Calcitriol
C) Hepcidin D) Ghrelin

50. The valve known as 'mitral valve:
A) Aortic valve B) Pulmonary valve
C) Left atrioventricular valve D) Right atrioventricular valve

51. Paedogenesis is the characteristic feature of:
A) *Ichthyophis beddomei* B) *Amblystoma tigrinum*
C) *Hyla arborea* D) *Sphenodon punctatum*

52. Which of the following is the reptilian feature of Archaeopteryx?
A) Presence of tarsometatarsus in the foot
B) Sclerotic plates and pecten in eyes
C) V-shaped furcula in the pectoral girdle
D) Jaws with thecodont dentition

53. Amacrine cells are found in:
A) Cornea B) Sclera C) Retina D) Choroid

54. Foetal Haemoglobin contains:
A) 2 α and 2β subunits B) 3 α and 1β subunits
C) 2 α and 2γ subunits D) 1 α and 3γ subunits

55. Pacinian corpuscles are receptors for:
A) Pain B) Smell C) Sound D) Pressure

56. RAG 1 and RAG 2 proteins involved in:
A) Recombination of immunoglobulin gene segments
B) Production of monoclonal antibody
C) Presentation of nonpeptide antigens to macrophages
D) Activation of complement protein C3

57. The resting adult heart rate above 100 bpm is called:
A) Tachycardia B) Bradycardia
C) Hypercardia D) Bradykalemia

58. Which of the following statements are correct about antibodies?
1. IgG1, IgG3, and IgG4 readily cross the placenta and play an important role in protecting the developing foetus.
2. IgG1 and IgG3 bind with high affinity to Fc receptors on phagocytic cells and thus mediate opsonization.
3. The hinge region of IgG2 and IgG3 is rich in valine and glycine residues
4. IgG3 is the most effective complement activator, followed by IgG1.

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

59. Analogous organs exhibit:
A) Convergent evolution B) Divergent evolution
C) Origin of Humans D) Sympatric speciation

60. Bursa of Fabricius is found in:
A) Mammals B) Aves C) Fishes D) Amphibians

61. *Rhynchophorus ferrugineus* is a pest of:
A) Paddy B) Rubber C) Coconut D) Sugar cane

62. Which one of the following is true about action potential?
A) Depolarization of an axon during an action potential is produced by outward diffusion of Na^+
B) Repolarization of an axon during an action potential is produced by outward diffusion of K^+
C) Depolarization of an axon during an action potential is produced by outward diffusion of K^+
D) Repolarization of an axon during an action potential is produced by outward diffusion of Na^+

63. The phenomenon in which a gene influences more than one single trait:
A) Epistasis B) Atavism C) Penetrance D) Pleiotropism

64. In Prawn, the green gland is located in:
A) First antennae B) Second antennae
C) First maxillae D) Second maxillae

65. *Trichonympha* leads a symbiotic life in the intestine of:
A) Honey bee B) Termite C) Locust D) Dragonfly

66. When the force of contraction generated is not enough to exceed the resistance of the object to be moved and the muscle does not change its length is known as:
A) Muscle Twitch B) Isometric contraction
C) Isotonic contraction D) Tetanic contraction

67. 5' → 3' exonuclease activity exhibited by DNA polymerase ----.
A) I B) II C) III D) IV

68. Which of the following is an example for autoimmune diseases?
A) Tay-Sachs disease B) Systemic lupus erythematosus
C) Li Fraumeni Syndrome D) Severe combined immunodeficiency

69. In electron transport chain, complex III catalyses Transfer of electrons from:
A) NADH to ubiquinone B) FADH to Ubiquinone
C) ubiquinol to cytochrome c D) reduced cytochrome c to cytochrome

70. Wallace line passes between:
A) Borneo and Celebes B) Sumatra and Malaya
C) Kei and New Guinea D) Java and Bali

71. Classical conditioning was discovered by:
A) Paul MacLean B) Konrad Lorenz
C) John Romanus D) Ivan Petrovich Pavlov

72. Match the following:

List I	List 2
a. Holoblastic equal cleavage	1. Frogs
b. Holoblastic unequal cleavage	2. Birds
c. Discoidal meroblastic cleavage	3. Insects
d. Superficial meroblastic cleavage	4. Echinoderms

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

73. Assertion (A) : Absconding occurs when a colony of bees leaves its home in search of another
Reason (R) : The tendency to abscond is mainly due to non-availability of forage.

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

74. The most common fixatives for electron microscopy:
1. Glutaraldehyde 2. Bouin's fluid
3. Osmium tetroxide 4. Uranyl acetate

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

75. Assertion (A) : In differential staining, Gram positive bacteria retain the crystal violet and hence appear deep violet in colour

Reason (R) : Gram-positive bacteria have a thinner peptidoglycan layer and higher percentage of lipid.

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

76. The learning by an animal **not** to respond to a stimulus is:
A) Imprinting B) Habituation
C) Latent learning D) Insight Learning

77. The temperature affecting the structure of animal is called:
A) Allen's rule B) Jordan's rule
C) Bergmann's rule D) Whitten's rule

78. The stain which is used to study the mitochondrial activity during cellular respiration:
A) Acetocarmine B) Eosin
C) Safranin D) Janus green B

79. The glycoproteins mediate Ca^{2+} - dependent cell-cell adhesion and transmit signals from the extracellular matrix to the cytoplasm is:
A) Clathrin B) Cadherin C) Calmodulin D) Cohesin

80. Genome of human immunodeficiency virus is:
A) Double stranded DNA
B) Double stranded RNA
C) Positive single stranded RNA
D) Negative single stranded RNA

81. The animals swim against the water current is called:
A) Oxoeotaxis B) Galvanotaxis
C) Rheotaxis D) Geotaxis

82. The sum of squares of deviations for 10 observations taken from mean 50 is 250. Then the coefficient of variation is:
A) 50 % B) 5 % C) 10 % D) 20 %

83. Which of the following statements are correct?
1. In bacteria, mRNA is transcribed and translated in the single cellular compartment.
2. Bacterial mRNA is relatively stable and continues to be translated for several hours.
3. A bacterial mRNA may be polycistronic in having several coding regions that represent different genes.

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

84. Assertion (A) : Dystrophic lakes are called as 'bad producing lakes' and there is little biodiversity able to survive.
Reason (R) : The lakes may be acidic because of incompletely oxidized decomposition products and organic acids

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

85. Inheritance pattern of Haemophilia:
A) Autosomal dominant B) Autosomal recessive
C) Sex linked dominant D) Sex linked recessive

86. Which of the following genotype causes Jacob's syndrome?
A) XO B) XXY C) XYY D) XXXX

87. Match the following:

List 1	List 2
a. Vitamin B_1	1. Pyridoxine
b. Vitamin B_2	2. Cyanocobalamin
c. Vitamin B_6	3. Thiamine
d. Vitamin B_{12}	4. Riboflavin

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

88. Chimmini Wildlife Sanctuary is located at:
A) Kottayam B) Idukki C) Kochi D) Thrissur

89. Kappa particles in the Paramecium:
A) *Caedobacter taneniospiralis*
B) *Acidophilus bifidus*
C) *Agrobacterium tumefaciensis*
D) *Ochromonasmalhamensis*

90. The protein required for protein folding:
A) Ubiquitinin B) Chaperone C) Connexins D) MCM proteins

91. African sleeping sickness is caused by:
A) *Trypanosoma gambiense* B) *Entamoeba histolytica*
C) *Balantidium coli* D) *Plasmodium falciparum*

92. Assertion (A) : The steroid derivative ouabain is a potent and specific inhibitor of the Na^+K^+ ATPase.
Reason (R) : Oubain binds preferentially to the form of the enzyme that is open to the extracellular side, locking in two Na^+ ions and preventing the changes of conformation necessary to ion transport.

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

93. The product derived from fungi, lovastatin is used to treat:
A) Hyperthyroidism B) Hyperglycaemia
C) Hypercholesterolemia D) Hypercalcemia

94. α oxidation of fatty acids occurs in:
A) Endoplasmic reticulum B) Mitochondria
C) Peroxisomes D) Lysosomes

95. DNA replication in Mitochondria is also known as:
A) Rolling circle replication B) D loop replication
C) Hoogsteen replication D) ω replication

96. Which of the following is **not** correct regarding crossing over?
A) The frequency of crossing over is directly proportional to the distance between the linked genes.
B) The frequency of crossing over generally increases with increasing age of the individual.
C) The frequency of crossing over helps in construction of genetic maps of chromosomes
D) Position of the genes in the chromosomes also determines the frequency of crossing over.

97. In both prokaryotic and eukaryotic cells, translation always initiates with the amino acid methionine, which is coded by:
A) AUU B) ACG C) AUG D) AAG

98. Dipicolinic acid is found in:
A) Endospore of fungus B) Endospore of bacteria
C) Cyst of protozoa D) Outer coat of virus

99. Type of skull in tortoise is:
A) Synapsid B) Diapsid C) Parapsid D) Anapsid

100. Which of the following is an example of catadromous fish?
A) Atlantic salmon B) European eel
C) Carp D) Sturgeon

101. In SDS-PAGE the role of β-mercaptoethanol:
A) It provides negative charge to proteins
B) It cleaves the disulphide bonds and denature proteins
C) It breaks the hydrogen bonds in the proteins
D) It provides density to the protein

102. The fossil of human named as 'handy man':
A) *Homo erectus* B) *Homo habilis*
C) *Homo neanderthalensis* D) *Homo luzonensis*

103. Which among the following is **not** an example of secondary database?
A) PROSITE B) PRINTS C) EMBL D) BLOCKS

104. Gause's Principle is associated with:
A) Mutualism B) Biotic potential
C) Competitive exclusion D) Coevoltuion

105. A group of co-existing species which share a common niche is called:
A) Deme B) Cline C) Guild D) Ecotone

106. Nomeus fish lives among the tentacles of physalia is an example for:
A) Mutualism B) Parasitism C) Predation D) Ammensalism

107. Myoglobin single polypeptide chain contains ---- amino acids.
A) 146 B) 143 C) 153 D) 156

108. Transcription of 5s rRNA takes place outside the nucleolar area and is catalysed by RNA polymerase -----.
A) I B) II C) III D) IV

109. The part of the brain responsible for the recognition of spoken and written language is:
A) Broca's area B) Wernicke's area
C) Pons D) Hippocampus

110. Identify the statement which is correct about DNA gyrase:
A) Type I topoisomerase found in prokaryote
B) Type I topoisomerase found in eukaryote
C) Type II topoisomerase found in prokaryote
D) Type II topoisomerase found in eukaryote

111. The software used for multiple sequence alignment:
A) GENSCAN B) CLUSTALW C) STAG D) MAGE

112. The axoneme of motile cilium consists of ---- arrangement.
A) 9+1 B) 9+2 C) 13+0 D) 13+2

113. The practical application of VNTR is:
A) DNA foot printing B) PCR
C) ELISA D) DNA profiling

114. The instrument used for measuring radioactivity of sample material:
A) Atomic absorption Spectrophotometer
B) MALDI-TOF
C) Liquid scintillation Counter
D) Flame Photometer

115. *Philosamia ricini* is related to:
A) Apiculture B) Mussel culture
C) Sericulture D) Pearl culture

116. A protein sequence database is:
A) NCBI B) DDBJ C) PIR D) EMBL

117. Which one of the following is a fresh water fish?
A) *Sardinella longiceps* B) *Rastrelliger kanagurta*
C) *Trachinotus blochii* D) *Oreochromis mossambicus*

118. Lactose is formed by which glycosidic linkage?
A) Galactose β 1-4 glucose B) Glucose α 1-4 glucose
C) Glucose β 1-4 fructose D) Glucose α 1-4 fructose

119. The Wildlife Protection Act was enacted in:
A) 1972 B) 1974 C) 1982 D) 1986

120. A group of female mice is exposed to a male for short term, oestrous cycle resumes and it will be synchronized in the majority of females is called:
A) McClintock effect B) Whitten effect
C) Vanderbergh effect D) Bruce effect