A

24735 **120 MINUTES**

1. Which of the following is true about kinetic effect of competitive inhibition?
   A) Decrease Km without affecting Vmax
   B) Increases Km without affecting Vmax
   C) Decreases both Km and Vmax
   D) Increases both Km and Vmax

2. The amino acid abundantly found in collagen:
   A) Methionine B) Glycine
   C) Tryptophan D) Glutamic acid

3. The primary function of Golgi apparatus in eukaryotic cells is:
   A) Protein synthesis
   B) Lipid synthesis
   C) Modification and packing of proteins
   D) Beta oxidation of fatty acids

4. Assertion (A) : Fatty acids with an odd number of carbon atoms can be fully oxidized through beta-oxidation.
   Reason (R) : The final product of beta-oxidation acetyl- CoA, can be incorporated into the citric acid cycle regardless of the carbon atom number.
   A) Both A and R are true and R is the correct explanation of A
   B) Both A and R are true but R is not the correct explanation of A
   C) A is true, but R is false
   D) R is true, but A is false

5. Glutathione is a :
   A) Polypeptide B) Tripeptide
   C) Oligopeptide D) Glycoprotein

6. Assertion (A) : Genetic drift has more significant impact on small populations in disrupting the Hardy-Weinberg equilibrium compared to large populations.
   Reason (R) : In smaller populations, chance events can lead to random fluctuations in allele frequencies.

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

7. In a clinical trial, if a researcher fails to reject the null hypothesis when it is false, what type of error is made?

A) Type I error B) Type II error
C) Sampling error D) Measurement error

8. The enzyme responsible for the conversion of citrate to isocitrate in TCA cycle:

A) Citrate synthase B) Succinyl CoA synthetase
C) Aconitase D) Isocitrate dehydrogenase.

9. Identity the autosomal dominant disorders:

1. Huntington's chorea 2. Cystic fibrosis
3. Myotonic dystrophy 4. Sickle cell anemia

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

10. Identify the **incorrect** option about penetrance is 100% :

A) All recessive genotype shows one phenotype
B) The expressivity is 100%
C) All dominant genotypes have a different phenotype
D) All the heterozygotes have similar phenotype

11. Pink pages in red data book represent:

A) Extinct animals B) Critically endangered animals
C) Threatened animals D) Extinct deep sea animals

12. Monocondylic skull is found in:

1. Amphibians 2. Reptiles 3. Aves 4. Mammals

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

13. When an animal learns to perform certain functions in response to many indifferent stimuli but without any apparent reward or punishment, it is called:

A) Insight learning B) Trial and error learning
C) Latent learning D) None of these

14. Male induction of estrous is called:

A) Vanderbergh effect B) Bruce effect
C) Whitten effect D) McClintock effect

15. *Neoplilina galathea* belongs to:

A) Scaphopoda B) Gastropoda
C) Monoplacophora D) Amphineura

16. Identify the correct options about Bence Jones protein:
    1. Presence of Bence Jones protein in urine indicates Multiple myeloma
    2. Bence Jones proteins are derived from gamma globulins
    3. Bence Jones protein is derived from alpha globulin

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

17. A group of co-existing species which share a common niche is called:
    A) Deme B) Subspecies C) Guild D) Race

18. Assertion (A): Recombination frequency never exceeds 50% but map distance can exceed 50 centiMorgans.
    Reason (R): The genes that are 50 map unit or apart, will behave as if they are independent of one another.

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

19. Species which are morphologically identical but do not interbreed are called:
    A) Subspecies B) Sibling species
    C) Polytypic species D) Allopatric species

20. Organisms that can tolerate narrow range of temperature are called:
    A) Stenothermal B) Ectotherms
    C) Endothermal D) Eurythermal

21. Cydippid is the larval stage of :
    A) Porifera B) Cnidaria C) Ctenophora D) Platyhelminthes

22. Lakshadweep is :
    A) Atoll B) Fringing reef C) Barrier reef D) Oceanic islands

23. Which of the following are free swimming larvae:
    1. Miracidium 2. Sporocyst 3. Redia
    4. Cercaria 5. Metacercaria

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

24. Camel belongs to the order:
    A) Chiroptera B) Artiodactyla C) Cetacea D) Perissodacyla

25. Identify the correct sequence of evolution of horse:
    1. Pliohippus 2. Meryhippus 3. Eohippus
    4. Equus 5. Mesohippus

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

26. Which following biogeographical realm includes India?
A) Neotropical B) Oriental C) Palearctic D) Nearctic

27. The 60S subunit of ribosome contains:
1. 5S rRNA 2. 5.8S rRNA 3. 28S rRNA 4. 16S rRNA

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

28. How does nuclear pore complex discriminate between different molecules during transport?
1. Size exclusion 2. Charge-based selection
3. Recognition by specific transport receptors 4. Lipid solubility

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

29. Ecdysone is secreted by:
A) Prothoracic gland B) Corpora allata
C) Corpora cardiac D) None of these

30. The amino acids known as semi-indispensible:
1. Glutamic acid 2. Arginine 3. Methionine 4. Histidine

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

31. The receptors for vibrations and deep pressure are:
A) Meissner's corpuscles B) Pacinian corpuscles
C) Krause end bulbs D) None of these

32. In cellulose D- glucose molecules are held together by:
A) Beta 1,4 glycosidic bond B) Alpha 1,4 glycosidic bond
C) Beta 1,6 glycosidic bond D) Alpha 1,6glycosidic bond

33. Which among the following are polysaturated fatty acids?
1. Linoleic acid 2. Arachidonic acid
3. Palmitic acid 4. Stearic acid

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

34. The compounds having 1,2-cyclopentanoperhydrophenanthrene nuclei are called :
A) Steroids B) Prostaglandins
C) Cephalins D) Glycolipids

35. Low Km value indicates:
A) High substrate affinity B) Low substrate affinity
C) High reaction rate D) Low reaction rate

36. The vitamin which is an antioxidant and plays a role in maintaining the health of the skin and mucous membrane?
A) Vitamin A B) Vitamin B C) Vitamin E D) Vitamin K

37. How does the body repay muscle oxygen debt after intense exercise?
A) Increased oxygen intake through breathing.
B) Increased heart rate
C) Continued anaerobic metabolism
D) All of these

38. In constructing phylogenetic trees using molecular data, what does a longer branch length typically indicate?
A) Greater genetic similarity
B) More recent common ancestry
C) Faster molecular evolution
D) Slower evolutionary rates.

39. In alloenzyme polymorphism studies, how are variations in enzymes typically identified?
A) Density gradient centrifugation
B) DNA sequence analysis
C) Gene expression profiling
D) Electrophoretic mobility

40. How does the sex index in Drosophila relate to the genes responsible for sex determination?
A) It reflects the activity of sex-determining genes on autosomes
B) It indicates the presence of sex-linked genes on the X-chromosomes
C) It correlates with the number of genes of the Y chromosome
D) It is independent of the genetic basis of sex determination

41. Assertion (A): Allopolyploidy among animals is extremely rare.
Reason (R) : Allopolyploidy involves the condition of chromosomes sets from different species and the reproductive barriers between animal species typically prevent the occurrence of allopolyploid individuals.

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

42. What is the significance of telomerase in relation to aging and cellular senescence?
A) Telomerase accelerates aging by promoting cell division
B) Telomerase prevents aging by repairing cellular damage
C) Telomerase has no impact on aging process
D) Telomerase helps maintain telomere length, slowing down the aging process

43. The primary function of desmosomes in cells is to:
    A) Provide structural support and mechanical strength by anchoring adjacent cells together
    B) Facilitate communication and exchange of molecules between neighboring cells
    C) Generate and conduct electrical impulses in excitable cells
    D) Regulate the passage of ions and small molecules across the cell membrane

44. Identify the **wrong** statements:
    1. Aneuploidy is caused due to non-disjunction
    2. Primary non-disjunction occurs during first meiotic division
    3. Secondary non-disjunction occurs during second meiotic division.
    4. Autopolyploids mostly exhibit exaggerations of characteristics already prevailing among diploid individuals.

    A) 1 & 2 only B) 2 & 3 only C) 3 &4 only D) None of these

45. Which of the following represents nullisomic condition?
    A) 2n-1 B) 2n-2 C) 2n+1 D) 2n+2

46. Microsatellites, also known as short tandem repeats (STRs), are:
    A) Short sequences of DNA that are repeated in tandem and vary in the number of repeats among individuals
    B) Highly conserved sequences of DNA that are present in multiple copies in the genome
    C) Regions of the genome that contain polymorphic single nucleotide variations
    D) Sequences of DNA that are located at the ends of linear chromosomes

47. In garden pea plant tall is dominant over dwarf and yellow seed is dominant over green seed. A heterozygous tall, yellow seeded plant is self-crossed and 80 seeds were obtained. How many of them would be tall -yellow seeded?
    A) 16 B) 5 C) 45 D) 15

48. A phase contrast microscope:
    A) Enhances contrast of transparent specimens by exploiting differences in refractive index
    B) Relies on staining techniques to highlight specific structures within the specimen
    C) Uses fluorescent labels to visualize cellular components
    D) Produces 3D images of the surface of objects

49. Which of the following is an example of a point mutation?
    A) Deletion of an entire chromosome
    B) Duplication of a chromosomal segment
    C) Substitution of one nucleotide for another
    D) Inversion of a chromosome segment.

50. Random Amplified Polymorphic DNA (RAPD) analysis is based on variations in the:
A) Length of DNA fragments produced by different restriction enzymes
B) Sequence of DNA fragments produced by PCR amplification using random primers
C) Mobility of DNA fragments in a gel matrix
D) Hybridization efficiency of DNA fragments

51. Which of the following is a tool provided by NCBI for searching and retrieving information from various biological databases?
A) PDB B) Swiss-PROT C) Entrez D) GenBank

52. Match the following:

List I	List II
a. Ernst Haeckel	1. Two kingdom system
b. Carolus Linnaeus	2. Three kingdom system
c. Robert Whittaker	3. Four kingdom system
d. Herbert F. Copeland	4. Five kingdom system

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

53. Cladistics is an approach to biological classification in which organisms are categorized in groups based on:
A) morphological similarities
B) most recent common ancestry
C) the number of common characters
D) the anatomical resemblances

54. According to International Code of Zoological Nomenclature scientific naming should avoid:
A) Principle of priority
B) Homonymy
C) Preservation of well-established names
D) None of these

55. Identify the feature present in some prokaryotes, but absent in eukaryotes:
A) Peptidoglycan cell wall B) Plasma membrane
C) Mitochondria D) Centrioles

56. Biradial symmetry is exhibited by:
A) Ctenophora B) Crustacea C) Cetacea D) Cephalopoda

57. Identify the group coming under sub-kingdom Parazoa:
A) Ctenophora B) Rotifera C) Placozoa D) Mesozoa

58. In flat worms like Planaria excretion is performed by:
A) Flame cells B) Green gland
C) Nephridia D) Contractile vacuole

59. Radula is a horny, ribbon like structure used for scraping or cutting food,found in the mouths of all mollusks **except:**
A) Gastropods B) Bivalves C) Scaphopods D) Cephalopods

60. Pedicellariae are:
A) small active tubular projections of Echinoderms having role in locomotion, feeding, and respiration
B) fleshy, paddle like segmented appendages of polychaete worms
C) pincer like structures of Echinoderms used in defense and in the removal of unwanted particles from the body
D) adhesive cytoplasmic organelle of ciliate protozoans

61. The survival status of the state bird of kerala, *Bucerosbicornis*, is indicated by "yellow" colour code in the Red Data Book, which means, the species is:
A) endangered B) vulnerable
C) near threatened D) least concern

62. The following are the respiratory structures of different Arthropods **except:**
A) Gills B) Trachea C) Ctenidia D) Book-lungs

63. Which among the following is a chordate, but not a vertebrate?
A) Ascidia B) Petromyzon C) Sea horse D) Star fish

64. Flightless birds, such as ostriches, belong to the order:
A) Passeriformes B) Galliformes
C) Struthioniformes D) Falconiformes

65. Match the following:

List I	List II
a. Coconut	1. *Saissetia nigra*
b. Sugar cane	2. *Leptocorisa varicornis*
c. Rubber	3. *Pyrilla perpusilla*
d. Rice	4. *Rhynchophorus ferrugineus*

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

66. The scientific name of the ornamental fish, known as "Miss Kerala":
A) *Puntius denisonii* B) *Poecilia reticulata*
C) *Xiphophorus maculates* D) *Pterophyllum scalare*

67. The enzyme, glycerone phosphate acyl transferase, that catalyze the first step in the biosynthesis of plasmalogens is present inside:
A) Peroxisome B) Mitochondria
C) Cytoplasm D) Golgicomplex

68. Process of evolution that suggests very short, rapid periods of change followed by long periods of stability:
A) Phyletic gradualism B) Punctuated equilibrium
C) Genetic drift D) Plesiomorphy

69. The Galápagos finches, which evolved into different species with distinct beak shapes to exploit different food sources, are an example of:
A) Adaptive radiation B) Convergent evolution
C) Coevolution D) Parallel evolution

70. Which of the following hominin species is believed to be the earliest to use stone tools?
A) *Homo erectus* B) *Homo habilis*
C) *Homo sapiens* D) *Australopithecus afarensis*

71. Biological magnification refers to the:
A) Increase in size of organisms over evolutionary time.
B) Enhancement of nutritive qualities of food as it goes up the food chain
C) Amplification of a pollutant concentration as it moves up the food chain.
D) Enlargement of cells during growth and development.

72. What is secondary productivity in an ecosystem?
A) The rate at which producers convert glucose to starch
B) The ratio of energy consumed by herbivores from that fixed by producers
C) The rate at which decomposers break down organic matter into nutrients.
D) The rate at which consumers convert organic matter into biomass.

73. Pyramid of numbers:
A) will be always upright B) may be upright or inverted
C) will be always inverted D) may be upright, inverted or partially upright

74. The type of ecological succession driven by biotic factors within an ecosystem is ------ succession.
A) primary B) autogenic C) allogenic D) autotrophic

75. Adopted as an extension of the UNFCCC in 1997, this protocol sets binding targets for industrialized countries to reduce their greenhouse gas emissions:
A) Kyoto Protocol B) Montreal Protocol
C) Stockholm Convention D) Rotterdam Convention

76. Learning that occurs without any obvious reinforcement or reward, and which is **not** immediately expressed in behaviour:

A) Insight learning B) Latent learning
C) Imprinting D) Operant learning

77. Leptin is a regulator of appetite secreted from:

A) Enteroendocrine cells in ileum and colon
B) Parietal cells in gastric fundus
C) Adipocytes throughout the body
D) Arcuate nucleus of hypothalamus

78. Match the following:

List I	List II
a. Pepsin	1.small intesine
b. Chymotrypsin	2. stomach
c. maltase	3. pancreas
d. ptyalin	4. salivary glands

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

79. Hamburger phenomenon:

A) Low level of oxyhaemoglobin enables blood to transport more carbon di oxide
B) High level of H^+ ions promote oxygen release from oxyhaemoglobin
C) Transport of bicarbonate ion from red blood cell into blood plasma in exchange for a chloride ion
D) None of the above

80. Tachycardia:

A) Persistent resting adult heart rate above 100 beats per minute
B) Persistent resting adult heart rate below 60 beats per minute
C) Persistent resting adult heart rate between 60 and 100 beats per minute
D) None of the above

81. The blood cells that play a critical role in pathogen-specific immunity by producing antibodies:

A) T lymphocytes B) Thrombocytes
C) B lymphocytes D) Eosinophils

82. The maturation of T lymphocytes takes place within:

A) Thyroid gland B) Parathyroid gland
C) Thymus gland D) Bone marrow

83. The cells in the distal convoluted tubule concerned with reabsorption of K^+ and secretion of H^+:

A) Principal cells B) Intercalated cells
C) Parietal cells D) Mesangial cells

84. The filamentous protein that stabilize the myosin filament, center it between the thin filaments, prevent overstretching of the sarcomere, and to recoil the sarcomere like a spring after it is stretched:
A) Desmin B) Nebulin C) Titin D) Tropomyosin

85. A sustained muscle contraction evoked when a muscle's motor unit is stimulated by multiple impulses at a sufficiently high frequency so that the relaxation phase disappears completely is called:
A) Summation B) Fatigue C) Tonus D) Tetanus

86. Identify the excitatory neurotransmitter:
A) GABA B) Glutamate C) Serotonin D) Dopamine

87. Mature differentiated neurons lack the cell organelle:
A) Centriole B) Golgi body
C) Endoplasmic reticulum D) Mitochondria

88. Which of the following is a mechanism of action for water-soluble hormones?
A) By inducing changes in the extracellular matrix
B) By entering the cell and binding to nuclear receptors
C) Activating G protein-coupled receptors
D) By entering the cell and binding to intracellular receptors

89. During the process of spermiogenesis the acrosome of sperm develops from:
A) Golgi bodies B) Mitochondria
C) Endoplasmic reticulum D) Centrioles

90. Which conformation of DNA exhibits the Watson & Crick Model?
A) A-DNA B) B-DNA C) Z-DNA D) All of these

91. RNA polymerases catalyze the formation of:
A) Peptide bond B) Ester bond
C) Phosphodiester bond D) Glycosidic bonds

92. Lipolysis is inhibited by:
A) Insulin B) Glucagon C) Epinephrine D) Carnitine

93. The product formed during the synthesis of fatty acid, by the condensation of acetyl ACP and malonyl ACP is:
A) Malonyl CoA B) Acetoacetyl ACP
C) Butyryl ACP D) Palmitoyl ACP

94. The enzyme involved in the release of NH_4^+ from glutamate:
A) Glutamate reductase B) Glumate decarboxylase
C) Glutamic oxidase D) Glutamate dehydrogenase

95. Identify the exclusively ketogenic aminoacidsin humans that can be degraded directly into acetyl-CoA, which is the precursor of ketone bodies:
A) Glutamic acid and Glutamine
B) Asparagine and Aspartic acid
C) leucine and lysine
D) Serine and Valine

96. Which among the following is used as a standard laboratory method to quantify the radioactivity of low energy radioisotopes?
A) liquid scintillation counter
B) ion exchange chromatography
C) ELISA
D) Nuclear Magnetic Resonance spectroscopy

97. Chi-square test is used to:
A) Examine whether two categorical variables are independent in influencing the test statistics
B) Determine the significance of the difference between the means of two sets of data
C) Split an observed aggregate variability found inside a data set into two parts
D) Express the probability of a given number of events occurring in a fixed interval of time or space

98. In a cross involving two genes that exhibit recessive epistasis, what phenotypic ratio would be expected in the F2 generation?
A) 15:1 B) 9:4:3 C) 9:3:3:1 D) 12:3:1

99. DNA polymerase enzyme involved in the replication of mitochondrial DNA:
A) DNA polymerase α (alpha)
B) DNA polymerase β (beta)
C) DNA polymerase γ (gamma)
D) DNA polymerase δ (delta)

100. The cloning vector ideal for carrying large DNA segments like eukaryotic genes:
A) Yeast artificial chromosomes
B) Plasmids
C) Cosmids
D) Phagemids

101. The molecules separated using electrophoresis can be transferred to nylon membranes in:
A) Southern blotting only
B) Northern blotting only
C) Southern blotting and Northern blotting
D) Southern blotting, Northern blotting, and Western blotting

102. The first approved gene therapy procedure was used to treat:
A) Cystic fibrosis B) Huntington's disease
C) Haemophilia D) Severe combined immunodeficiency

103. Name the first cloned rhesus macaque, using the technique, called "embryo splitting":
A) ReTro B) Tetra
C) Lulu and Nana D) Zhong Zhong and Hua Hua

104. The prokaryotic structure absent in mycoplasmas:
A) Double stranded circular DNA
B) Peptidoglycan cell wall
C) Three layered cellular membrane
D) 70S ribosomes

105. Zika virus is transmitted to people primarily through:
A) Respiratory droplets and contact routes
B) The bite of an infected Aedes species mosquito
C) Bite of an infected female Anopheles mosquito
D) Direct contact with infected animals, such as bats or pigs, or their body fluids

106. GLUT3 is a class I facilitative glucose transporter mainly present in:
A) Hepatocytes B) kidney tubule cells
C) Brain D) intestinal brush border cells

107. The tight junctions are composed of the following proteins **except:**
A) Occluding B) Junction adhesion molecule proteins
C) Claudins D) Cadherins

108. The inner mitochondrial membrane is characterized by the presence of an unusual phospholipid:
A) Cardiolipin B) Porins
C) ATP synthase D) Mitofilin

109. Cathepsin enzymes produced by lysosomes act on:
A) Glycogen B) Triacylglycerol
C) Protein D) DNA and RNA

110. The complex integral for the progression of the cell from the Growth 1 phase to the Synthesis phase of the cell cycle, for the Start or G1/S checkpoint is Cyclin:
A) A/Cdk1 B) D/Cdk4 C) B/Cdk1 D) A/Cdk2

111. BCR-ABL fusion gene is associated with:
A) Renal cell cancer
B) Sporadic thyroid cancer
C) Invasive ductal breast cancer
D) Chronic myeloid leukemia

112. Desmin filaments are found in:
A) Neurons B) Muscle cells
C) Epithelial cells D) Hepatocytes

113. Identify the Hydrophobic second messenger:
A) phosphatidylinositol
B) Cyclic adenosine monophosphate
C) Cyclic guanosine monophosphate
D) Inositol trisphosphate

114. Which is the first amino acid to dock in the ribosome to initiate protein synthesis in eukaryotes:
A) Glycine B) Valine C) Methionine D) Phenylalanine

115. Gene transcription is repressed by:
A) Methylation of CpG sites in the promoter region
B) methylation of CpGs in the body of a gene
C) TET enzyme activity in the CpGsof a gene promoter
D) All the above

116. SARS-CoV-2 virus is a---- virus.
A) "Positive-strand" ssRNA B) "Negative-strand" ssRNA
C) Tailed dsDNA D) dsDNA

117. The component of RNA-induced silencing complex, that activates and cleaves the target mRNA:
A) protein kinase RNA activator
B) transactivation response RNA binding protein
C) endoribonuclease Dicer
D) Argonaute

118. The protein for manufacturing 'BioSteel', a high-strength fiber-based material, produced by Transgenic:
A) mice B) goat
C) spider D) silk worm moth

119. A multiple sequence alignment tool provided by DDBJ:
A) BLAST B) FASTA C) ClustalW D) Chime

120. Holandric genes are inherited from:
A) Mother to daughter only B) Father to son only
C) Father to daughter only D) Father to grandson through daughter