

18. Which among the following is the pair with the lowest and highest thresholds of hearing in terms of frequency of sound waves?
 A) Humans and dogs B) Elephants and bats
 C) Whales and dolphins D) Whales and bats
19. With respect to Hemichordates and Annelids, which of the following statement is correct?
 A) Pharyngeal gill slits are absent in Hemichordates while they are present in Annelids.
 B) Heart is dorsal in Hemichordates while it is ventral in Annelids
 C) Pharyngeal gill slits are present in Hemichordates while they are absent in Annelids.
 D) Pharyngeal gill slits are absent in both
20. *Lissachatina fulica* is the:
 A) Edible snail B) Predatory insect of African snail
 C) Marine slug D) African snail
21. Which among the following is the correct combination of pests of agricultural plants?
 A) Trichogramma; Spodoptera; Helicoverpa
 B) Spodoptera; Callosobronchus; Coccinella
 C) Placaederus; Scirpophaga; Opisina
 D) Trichogramma; Oryctes; Coleomegilla
22. The nervous system of mammals is derived from:
 A) Endoderm B) Mesoderm C) Ectoderm D) Mesogloea
23. An inherited disorder of nucleotide metabolism is:
 A) Huntington's disease B) Sickle cell anaemia
 C) Cri-du-chat syndrome D) Lesh-Nyhan syndrome
24. Which among the following is used as a fumigant to protect stored grains?
 A) DDT B) Formaldehyde
 C) Ethidium tetroxide D) Phosphine
25. The commercial name of the hormone used to induce ovulation in fish for aquaculture practices is:
 A) Nandrolone B) Ovalute C) Ovaprim D) Oxytocin
26. In composite aquaculture, the selection of fishes is made on the basis of minimising the competition for space, food and compatibility. Which among the following is a suitable composition?
 A) Etroplus, Channa, Mugil B) Mugil, Anabas, Carp
 C) Catla, Rohu, Mrigal D) Clarias, Etroplus, Tilapia
27. The rodents that commit mass suicide by drowning
 A) Capybara B) Chinese hamsters
 C) Lemmings D) Sewer rats
28. The most important of all bio-geochemical cycles among the following is
 A) Nitrogen cycle B) Carbon cycle
 C) Water cycle D) Phosphorus cycle

29. An antibiotic peptide containing D-amino acids seen only in bacteria is
 A) Gramicidin B) Penicillin C) Streptomycin D) Mannose
30. According to the Neutral Theory of Evolution, “the random nature of mutational processes will in time change a protein in such ways that do not significantly affect its function”. The interpretations that can be made from this hypothesis is/ are that:
1. Genetic mutations in coding sequences are always evident in the expressed products.
 2. Unless mutations affect the functional domains and motifs of proteins its impact on the evolutionary process is insignificant.
 3. Neutral mutations do not affect an organism’s ability to survive
- A) Statements 1, 2 and 3 are true
 B) Statements 1 and 2 only are true
 C) Statements 2 and 3 only are true
 D) Statements 1 and 3 only are true
31. In cultural evolution theory, an idea, behaviour or style that spreads from person to person is known as:
 A) Replicator B) Habit
 C) Fixed action pattern D) Meme
32. Find the combination which is not favourable to Hardy-Weinberg equilibrium.
1. Small population
 2. Closed population
 3. Random mating
 4. Selection pressure
- A) 2 and 3 only B) 1 and 4 only C) 3 and 4 only D) 1 and 3 only
33. Choose possible outcomes of bottle-neck effect from the following:
1. Loss of favourable mutations
 2. Fixation of deleterious mutations
 3. Random distribution of genes
 4. Heterosis
- A) 1 and 3 only B) 1 and 2 only C) 3 and 4 only D) 2 and 4 only
34. Terrestrial Hermit Crabs come under the family:
 A) Diogenidae B) Coenobitidae
 C) Paguridae D) Artemiidae
35. Biomagnification of DDT occurs because of its propensity to:
 A) Be soluble in lipids
 B) Form complexes with lipids
 C) Form complexes with protein
 D) Form complexes with carbohydrates
36. Medical laboratory kits that test for pregnancy look for:
 A) Progesterone B) Oestrogen
 C) Chorionic gonadotropin D) Oxytocin

37. **Assertion:** The pyramid of energy can never be inverted.
Reason 1: Much of the biomass in any trophic level dies off without being eaten
Reason 2: Primary producers cannot be exhausted
Reason 3: Rate of conversion of biomass into the next trophic level is very small
- A) The assertion is false
 B) The assertion is true and reason 1 sustains the assertion
 C) The assertion is true and reason 2 sustains the assertion
 D) The assertion is true and reason 3 sustains the assertion
38. Which among the following is commensalism?
 A) Tree frog and trees B) Domestication of cattle
 C) Probiotics in the human gut D) Microfilaria in humans
39. Identify the correct objective(s) of the Kyoto Protocol
 1. Fight global warming by reducing greenhouse gas concentrations
 2. It puts the obligation to reduce current emissions on developed countries on the basis that they are historically responsible for the current levels of greenhouse gases
 3. Regulate international trade in endangered species of Wild Life
 4. Assignment of liabilities for damages caused in case of nuclear accidents
- A) 1 and 2 only B) 1, 2 and 3 only
 C) 1, 2, 3 and 4 D) 3 and 4 only
40. Which among the following is not situated in Kerala?
 A) Pushpagiri Wildlife Sanctuary
 B) Aralam Wildlife Sanctuary
 C) Chinnar Wildlife Sanctuary
 D) Shendurney Wildlife Sanctuary
41. Navigation by migrating salmon is oriented on the basis of:
 A) The position of the sun
 B) The relative position of the sun and its natal river
 C) The relative position of the sun and the Earth's magnetic field
 D) Magnetoception and sense of smell
42. The animal credited with the longest migration is:
 A) Eel B) Salmon
 C) Arctic Tern D) Leatherback turtles
43. The El Nino:
 A) Is a warm current that flows eastward from the Tropics to the coasts of Peru and Ecuador
 B) Is a warm current that flows westward from the Tropics to the coasts of India and Sri Lanka
 C) Is a warm current that flows northward from the Tropics to the cold coasts of North America
 D) Is a cold current that flows southward from the Arctic to the warm coasts of Peru and Ecuador

61. The biochemical that inhibits transmission of impulses in spinal neurons is:
 A) Acetylcholine B) Glycine
 C) Nicotine D) MSG
62. The major component in activated sludge is:
 A) Diatomaceous earth B) Saprotrophic bacteria
 C) Activated charcoal D) Chemical oxidants
63. The oldest surviving lepidosaurian reptile is:
 A) Iguana B) Sphenodon
 C) Chameleon D) Turtles
64. The sharp vision of birds of prey is attributed to the presence of:
 A) Nictitating membrane B) Tapetum
 C) Pecten D) Vision in the UV range
65. Expression levels of a large number of genes can be simultaneously studied by:
 A) Polyacrylamide gel electrophoresis
 B) Microarray analysis
 C) DNA fingerprinting
 D) Confocal microscopy
66. The immune related rejection of the human foetus does not occur because
 A) The placenta has its origin from the mother's uterine tissue
 B) The placenta does not have any antigenic proteins
 C) MHC antigens are not expressed in the cells of the placenta
 D) The placenta does not come in close contact with the uterine tissue
67. Cytoplasmic control of nuclear activity is most evident in:
 A) Embryonic stem cells B) Adult stem cells
 C) Undividing somatic cells D) Prokaryotes
68. In hymenoptera, female offspring produced by thelytoky occurs by:
 A) Fusion of proto-eggs from the same meiotic set
 B) Fusion of proto-eggs from different meiotic sets
 C) Development of unfertilised eggs
 D) Development of fertilised eggs
69. An example for a passive vaccine is:
 A) Tetanus toxoid vaccine B) Anti-tetanus toxoid vaccine
 C) MMR vaccine D) Hepatitis B vaccine
70. Which among the following is not a function of the corpus luteum?
 A) Secretion of the progesterone
 B) Secretion of oxytocin
 C) Secretion of menstrual hormones
 D) Secretion of inhibin

80. A disease caused by chromosomal jumping translocations in humans:
 A) Hodgkins lymphoma B) Chronic myelogenous leukemia
 C) Giant cell carcinoma D) Cervical cancer
81. The cAMP cascade that leads to glycogenolysis is triggered by:
 A) Insulin B) Glucagon
 C) Ribulose-bis-phosphate D) Phosphoenolpyruvate
82. The sting gland of the wasp is a modified
 A) Sternal plates B) Ovipositor
 C) Tergum D) Mandibles
83. The fate of the last 3-carbon fragments of odd chain fatty acids undergoing beta oxidation is
 A) Entry into the Kreb's cycle as acetyl-CoA
 B) Entry into Kreb's cycle as propionyl-CoA
 C) Conversion to 6-carbon glucose by dimerisation
 D) Entry into Kreb's cycle as succinyl-CoA
84. Excess amino acids absorbed from the diet is:
 A) Stored in the liver B) Stored in the muscles
 C) Deaminated by the liver D) Converted to urea by the kidneys
85. The resolving power of a compound microscope is limited by the wavelength of light and:
 A) Magnifying power of the eye piece
 B) Magnifying power of the objective
 C) Numerical aperture
 D) Focal length of the objective
86. The extend of the error bar in a graphical representation of data indicates
 A) The mean value
 B) The size of the population
 C) The extent of variation within the raw data
 D) The degree of correlation between the two variables
87. The graph you would expect when the co-relation constant between two variables is 1, is:
 A) A straight line parallel to the X axis
 B) A straight line parallel to the Y axis
 C) A straight line at 45° to the X axis starting from the origin
 D) A sigmoidal graph starting from the origin
88. The Chi-square test is used to analyse
 A) Relationships between two dependent variables
 B) Relationship between two independent variables
 C) Differences between observed and expected values
 D) Differences between mean and median

89. Trisomy of chromosome 21 in humans causes
 A) Patau syndrome B) Down syndrome
 C) Jacobsen syndrome D) Edward syndrome
90. With respect to the Genic balance theory, which of the following statements are true in *Drosophila*?
 1. Sex of the offspring is determined by a ratio of the number of X chromosomes to that of the number of sets of autosomes
 2. The X chromosome contains genes with female characteristics while the autosomes contain genes with the male characteristics
 3. The Y chromosome does not have any role in sex determination
 A) 1, 2 and 3 are true B) 1 and 3 only are true
 C) 1 alone is true D) 2 and 3 only are true
91. An exact clone of a eukaryote can be obtained by:
 A) Artificial insemination
 B) Embryonic stem cell cloning
 C) Intra-cytoplasmic gamete injection
 D) IVF
92. This hormone acts on all cells in the human body, influences metabolic rate, affects protein synthesis and plays a major role in hibernating animals. The hormone is
 A) Adrenalin B) Thyroxine C) Oxytocin D) Glucagon
93. The F₀-F₁ component of ATP synthase - a molecular motor - is driven by:
 A) Electrons B) Protons C) GTP D) NADP
94. With respect to the transport of glucose across cell membranes which of the following is/ are true:
 1. GLUT 1 is involved in the transport across erythrocyte membrane
 2. GLUT 2 is involved in the transport across membranes of intestinal cells and liver cells.
 3. GLUT 3 is involved in the transport across neuronal membrane while GLUT 4 is involved in the transport across striated muscle membrane
 A) 1 alone is true B) 2 alone is true
 C) 1, 2 and 3 are true D) 2 and 3 only are true
95. The major component of the eukaryote cytoskeleton is:
 A) Dynein B) Kinesin C) Calcium D) Tubulin
96. Guillain-Barré syndrome is an abnormal condition arising out of
 A) Mutations in mitochondrial DNA
 B) Sex-linked inheritance
 C) Auto-immune reactions
 D) Chromosomal aberrations

97. Which among the following are true with respect to the fluid-mosaic model of the cell membrane?
1. The constituents of the membrane are in constant motion but are limited by the cytoskeleton and the extracellular matrix
 2. The proteins embedded in the phospholipid layer appear and disappear according to the functional state of the cell
 3. The model demonstrates that integrity of the membrane is not influenced by Van der Waals forces and hydrophobic interactions
- A) Statements 1, and 3 only are true
 B) Statements 1, 2 and 3 are true
 C) Statements 1 and 2 only are true
 D) Statement 1 alone is true
98. The multiple pass channels in the plasma membranes are formed by:
- A) Type I trans-membrane proteins.
 B) Type II trans-membrane proteins.
 C) Type III trans-membrane proteins.
 D) Type IV trans-membrane proteins.
99. Dopamine, the neurotransmitter signal released by nerve cells is a derivative of:
- A) Glutamine B) Tyrosine C) Histidine D) Glycine
100. The metallic component of the prosthetic group of DNA polymerase is:
- A) Manganese B) Copper C) Magnesium D) Iron
101. Bence-Jones proteins occur in the urine of patients with:
- A) Kwashiorkor B) Phenylketonuria
 C) Multiple myeloma D) Alkaptonuria
102. The underlying cause of the heritable disorder osteogenesis imperfecta (brittle bone disease) is due to the changes in:
- A) Oestrogen levels
 B) Collagen structure
 C) Dietary levels of Vitamin C
 D) Calcium metabolism
103. The mechanical properties of silk which is one among the stronger natural fibres is dependent on:
- A) Presence of keratin B) Presence of beta sheets
 C) Absence of beta sheets D) Alternation of beta sheets with alpha sheets
104. Which among the following respiratory pigments do not contain a haem group?
1. Leghaemoglobin
 2. Haemerythrin
 3. Chlorocruorin
 4. Haemocyanin
- A) 1 and 3 only B) 1, 2 and 4 only
 C) 2 and 4 only D) 3 and 4 only

105. Which among the following is not involved in regulating carbohydrate metabolism in humans?
 A) Glucagon B) Calcitonin C) Somatostatin D) Cortisol
106. Which among the following is a precursor for steroid hormones?
 A) Cholesterol B) Tyrosine C) Glycerol D) Glutamine
107. Consider the following statements:
Assertion: Consumption of methanol results in blindness and death
Reason 1: Methanol affects nerve function by inhibiting acetylcholine esterase resulting in blindness and death
Reason 2: Methanol is converted to formaldehyde and formates by the liver which causes blindness and death
Reason 3: Methanol is converted to hydrogen cyanide by the Hydrochloric acid in the stomach which causes blindness and death
- A) The assertion and reason 1 are true and the reason explains the assertion
 B) The assertion and reason 2 are true and the reason explains the assertion
 C) The assertion and reason 3 are true and the reason explains the assertion
 D) The assertion is true but none of the reasons explains the assertion
108. In which of the following conditions the bacterial growth curve becomes a plateau and then dips?
 1. Nutrients are exhausted 2. Waste products become inhibitors.
 3. pH becomes acidic. 4. It reaches Hayflick limit.
- A) 1, 2, 3 and 4 are true B) 1, 2 and 3 only are true
 C) 1 and 2 only are true D) 4 alone is true
109. The most conserved protein among the following as revealed by phylogenetic analyses is:
 A) Haemoglobin B) Cytochrome c
 C) Histone D) Fibrinogen
110. The correct sequence of steps to be followed in a microarray experiment to quantify gene expression is
 A) Sample → protein → Reverse transcription → cDNA → labelling → coupling to DNA probe → scanning and quantification.
 B) Sample → mRNA → Reverse transcription → cDNA → labelling → coupling to DNA probe → washing → scanning and quantification.
 C) Sample → DNA → PCR → coupling to DNA probe → washing → scanning and quantification.
 D) Sample → mRNA → cDNA → rDNA → plasmid clone → labelling → coupling to protein probe → washing → scanning and quantification.

111. With respect to BLAST, which of the following are true?
1. The BLAST algorithm is heuristic
 2. The target sequence is larger than the query sequence
 3. The target sequence is smaller than the query sequence
 4. It aligns sequences only from secondary databases
- A) 1, 2 and 4 only B) 1 and 3 only
 C) 1 and 2 only D) 2 and 4 only
112. Computing the structure of a protein from a given amino acid sequence depends on:
- A) Carboxyl group of each amino acid in the protein
 - B) Presence and number of glycine in the protein
 - C) R group and bond angles of each amino acid in the protein
 - D) Amino group of each amino acid in the protein
113. A database which contains data that have been checked and vouched for accuracy is known as:
- A) Secondary database B) Curated database
 - C) Primary database D) Purged database
114. Sequencing of proteins reveal that:
- A) L-form of amino acids alone is seen in proteins.
 - B) Both L and D-form of amino acids are seen in proteins.
 - C) D-form of amino acids alone is seen in amino acids.
 - D) Structure of a protein is stable only when it contains D-form of amino acids.
115. Zwitter ions are molecules that bear:
- A) No charged groups.
 - B) Negatively charged polarities on opposite ends.
 - C) Charged groups of opposite polarity.
 - D) Charged groups of similar polarity.
116. This protein which loses its function when it associates with its substrate is known as a 'suicidal enzyme'. Which is it?
- A) Cytochrome oxidase B) Beta-galactosidase
 - C) DNA methyl transferase D) Lipxygenase
117. Which among the following will enable you to visualise a proteinaceous ligand binding to its cell surface receptor?
- A) ELISA B) Polarised light microscopy
 - C) Immunohistochemistry D) Confocal microscopy with DAPI stain
118. The first and definitive proof that DNA is the genetic material was given by
- A) Gregor Johann Mendel B) Avery, McLeod and McCarty
 - C) Watson and Crick D) Hershey and Chase

119. The genetic disease caused by insufficiency of the enzyme hexosaminidase is
- A) Cri-du-chat syndrome
 - B) Tay-Sachs disease
 - C) Severe combined immunodeficiency syndrome
 - D) Xeroderma pigmentosum
120. The end product of glucose metabolism in an oxygen starved muscle is
- A) Creatine phosphate
 - B) CO_2
 - C) Lactic acid
 - D) Bicarbonate ions
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