

A1 VERSION CODE	ELIGIBILITY EXAMINATION-2025 PAPER-2 Total Number of Questions : 100 Maximum Marks : 200 Subject : LIFE SCIENCES Subject Code : 28								Serial Number :
	MENTION YOUR REGISTER NUMBER								Paper Code

INSTRUCTIONS FOR CANDIDATES

DOs:

1. This question booklet is issued to you at **9.55 AM** by the room invigilator.
2. Check whether the Register Number has been entered and shaded in the respective circles on the OMR answer sheet.
3. The version code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
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5. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DON'Ts:

- **THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED / MUTILATED / SPOILED.**

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. In case of usage of **signs and symbols** in the questions, the regular textbook connotation should be considered unless stated otherwise.
2. This question booklet contains **100** questions and each question will have one statement and four different options / responses & out of which you have to choose one correct answer.
3. **After 10.00 AM**, remove the paper seal of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet within 5 minutes of the commencement of exam. Read each item and start answering on the OMR answer sheet.
4. Completely **darken / shade** the relevant circle with a **blue or black ink ballpoint pen** against the **question number on the OMR answer sheet**.

ಸರಿಯಾದ ಕ್ರಮ CORRECT METHOD				ತಪ್ಪು ಕ್ರಮಗಳು WRONG METHODS											
⊗	②	③	④	①	②	③	④	①	●	●	④	①	●	③	④
①	●	③	④	①	●	③	④	①	●	③	④	①	●	③	④

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6. Use the space provided on each page of the question booklet for rough work. Do not use the OMR answer sheet for the same.
7. **Once the last Bell rings at 1.00 PM**, stop writing on the OMR answer sheet and hand over the **OMR answer sheet** to the room invigilator as it is.
8. After separating the top sheet (Office copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you.
9. All questions carry equal marks.
10. **There will be no negative marking.**
11. Use of Mobile Phones, Calculators and other Electronic/Communication gadgets of any kind is prohibited inside the Examination venue.

DO NOT WRITE HERE

1. Arrange the following interactions in increasing order of bond energy:
 - a) Hydrogen bond
 - b) Van der Waals interaction
 - c) Covalent bond
 - d) Hydrophobic interaction
 - (1) b, d, a, c
 - (2) a, b, c, d
 - (3) c, a, b, d
 - (4) a, c, d, b

2. When pure acetic acid and toluene are transferred to water, they exhibit contrasting changes in heat capacity (–ve for acetic acid, +ve for toluene). The appropriate explanation for this is
 - (1) Hydrogen bonds formed between water molecules near acetic acid are more labile than those formed near toluene
 - (2) Hydrogen bonds formed between water molecules near toluene are more labile than those formed near an ionic acetic acid
 - (3) Toluene does not induce hydrogen bonding in water molecules around it, but acetic acid does.
 - (4) Hydrogen bonds formed in the water molecules near acetic acid are less labile than those formed near toluene

3. Lanosterol, a triterpene composed of six isoprene units is chemically known as
 - (1) Isopentene
 - (2) Isobutane
 - (3) 1,3-Butadiene
 - (4) 2-Methyl-1, 3-butadiene

4. A reaction catalyzed by UMP synthase in the presence of uridine and ribose-5-phosphate yields only *syn*-UMP because
 - (1) The enzyme exhibits stereospecificity
 - (2) Rotation around the glycosidic bond is sterically hindered due to the H-atom on C'₂ carbon of furanose
 - (3) Rotation around the glycosidic bond is sterically restricted due to the H-atom on C'₂ of pyranose
 - (4) The pyrimidine ring exhibits preference to *syn* conformation

5. Oxygen saturation curve of haemoglobin at pH 6.8 will be displaced to the right (higher pO₂) relative to its position at pH 7.6. The phenomenon can be due to _____
 - (1) H⁺ is an antagonist of O₂ binding
 - (2) N-terminal NH₂ group of two α-chains and His β146 take up H⁺ under lower pH
 - (3) Bohr's effect
 - (4) N-terminal NH₂ groups of two β-chains take up H⁺ under low pH

6. The dihedral or torsional angle parameters employed to construct the Ramachandran plot to predict the allowed and disallowed angles (ϕ and ψ) to predict the secondary structural motifs is primarily based on _____

- (1) Van der Waal radii of atoms/groups (2) Atomic radii
(3) Dipole moments of the atoms/groups (4) Electron cloud

7. Match the enzymes in Column-A with their corresponding catalytic mechanisms in Column-B.

Column-A

Column-B

- | | |
|---|------------------------------------|
| a) Glyceraldehyde-3-phosphate dehydrogenase | i) Electrostatic interaction |
| b) Acid phosphatase | ii) General acid or base catalysis |
| c) Carboxypeptidase-A | iii) Metal ion catalysis |
| d) Trypsin | iv) Covalent catalysis |

Codes:

- | | |
|------------------------------------|------------------------------------|
| (1) a – ii, b – iii, c – i, d – iv | (2) a – iv, b – ii, c – iii, d – i |
| (3) a – iii, b – ii, c – i, d – iv | (4) a – iv, b – iii, c – ii, d – i |

8. In silk fibroin, the occurrence of alternating hydrophobic and hydrophilic residues in the primary sequence is fundamental to the secondary structure. A secondary structure of protein generated by alternating side chains projecting on the same side of the polypeptide chain is

- (1) Right-handed α -Helix (2) β -bends
(3) Parallel β -Sheet (4) Antiparallel β -Sheet

9. Match the components of Column-A with Column-B:

Column-A

Column-B

- | | |
|----------------------|--|
| i) Epiphysis | a) Sheath of connective tissue covering bone |
| ii) Diaphysis | b) Matrix secreting cells of cartilage |
| iii) Periosteum | c) Mineral part of bone matrix |
| iv) Chondroblasts | d) Head of long bones |
| v) Calcium phosphate | e) Hollow shaft of bone |

Codes:

- (1) i – c, ii – b, iii – e, iv – d, v – a
(2) i – d, ii – e, iii – a, iv – b, v – c
(3) i – e, ii – c, iii – a, iv – d, v – b
(4) i – c, ii – d, iii – b, iv – a, v – e

10. Match the components of Column-A with Column-B:

Column-A	Column-B
i) Centromere	a) DNA binding proteins
ii) Chromatids	b) DNA with histone octamer
iii) Histones	c) Structure that holds chromatids
iv) Nucleosomes	d) The two parts of chromosome
v) Basal bodies	e) Modified centrioles that occur at the base of cilia and flagella

Codes:

- (1) i – b, ii – a, iii – d, iv – e, v – c
 (2) i – c, ii – d, iii – a, iv – b, v – e
 (3) i – a, ii – c, iii – d, iv – b, v – e
 (4) i – c, ii – b, iii – a, iv – d, v – e

11. Rapid assembly and disassembly of focal adhesion during cell movement primarily involves changes in the conformation of

- (1) Vinculin (2) Actin
 (3) Integrin (4) Laminin

12. Match the components of Column-A with Column-B

Column-A	Column-B
i) <i>Chryseobacterium greenlandensis</i>	a) <i>Acidophile</i>
ii) <i>Natromonas pharaonis</i>	b) <i>Thermophile</i>
iii) <i>Thiobacillus acidophilus</i>	c) <i>Alkaliphile</i>
iv) <i>Geobacillus stearothermophilus</i>	d) <i>Psychrophile</i>
v) <i>Halorhabdus rudnickae</i>	e) <i>Halophile</i>

Codes:

- (1) i – c, ii – e, iii – b, iv – a, v – d
 (2) i – d, ii – c, iii – a, iv – b, v – e
 (3) i – d, ii – b, iii – a, iv – c, v – e
 (4) i – a, ii – d, iii – c, iv – b, v – e

13. ADH contributes to concentration of urine in kidneys by

- (1) Elevating the transcription of aquaporin-I gene
 (2) Increasing the insertion of aquaporin-II to apical membrane
 (3) Decreasing the insertion of aquaporin-II to apical membrane
 (4) Inhibiting function of V_2 receptors on collecting duct

14. The licensing factor (MCM) involved in restricting DNA replication initiation only to G_1 phase is due to
- (1) Prevention of MCM helicases binding to DNA in S, G_2 and M phases
 - (2) Degradation of MCM in G_1 phase
 - (3) Promotion of MCM and ORC binding to DNA in M-phase
 - (4) Prevention of MCM binding to ORC due to increased Cdc₆ and Cdt₁.
15. Which of the following characteristics best describes the euchromatin?
- (1) Wider positioning of nucleosomes, acetylation of H_3K_9
 - (2) Closer positioning of nucleosomes, methylation of H_3K_9
 - (3) Closer positioning of nucleosomes, acetylation of H_3K_9
 - (4) Wider positioning of nucleosomes, methylation of H_3K_9
16. The major distinction between mitochondrial and peroxisomal β -oxidation is
- (1) Oxidation does not include acyl-CoA intermediates in peroxisomes
 - (2) End products in peroxisomes is acetic acid
 - (3) FADH from first step in peroxisomes transfers electrons to O_2
 - (4) FADH from first step in peroxisomes transfer electrons to respiratory chain
17. When deaminated cytosine is to be removed during DNA repair, which of the following enzymes is responsible for generating apurinic/apyrimidinic (AP) site in the damaged strand?
- (1) AP endonuclease
 - (2) Uracil N (DNA) glycosylase
 - (3) DNA ligase
 - (4) Phosphodiesterase
18. DNA with non-palindromic sequences with inverse orientation is recognised and cut at 25-28 bases from recognition sites. Which of the given enzymes catalyses this reaction?
- (1) Type-I restriction endonuclease
 - (2) Type-II restriction endonuclease
 - (3) Type-III restriction endonuclease
 - (4) Both Type-I and Type-II restriction endonucleases
19. Which statement is TRUE about the Shine-Dalgarno sequence?
- (1) A ribosomal binding site found in bacterial and archaeal mRNA
 - (2) A protein translation initiation site found in most eukaryotic messenger RNA
 - (3) Not found in the promoters of genes in both prokaryotes and eukaryotes
 - (4) It has the sequence of AAGGAA

20. Capping of mRNA prevents the rapid cleavage and is catalyzed by guanylyl transferase. Identify the nucleotide cap that is attached at the 5' end of the mRNA
- (1) 5-methylguanosine
 - (2) 7-methylguanosine
 - (3) 6-methylguanosine
 - (4) 4-methylguanosine
21. Thermal denaturation of protein causes
- (1) Conformational change in the protein
 - (2) Random cleavage of the peptide bonds
 - (3) Covalent modification of certain amino acids
 - (4) Increase in its isoelectric point
22. How can post-translational modifications influence a protein's function?
- (1) By changing the sequence of a protein
 - (2) By modifying the proteins conformation, activity or stability
 - (3) By activating the signal peptides
 - (4) By targeting the signal peptides for proteolytic cleavage
23. Common bacterial DNA binding regulatory protein motif is
- (1) Zinc Finger
 - (2) Helix-turn-Helix
 - (3) Leucine Zipper
 - (4) Helix-loop-Helix
24. Virus enters the host cell via endocytosis which DOES NOT involve
- (1) Clathrin coated vesicle formation
 - (2) Crossing of plasma membrane at neutral pH
 - (3) Confirmation changes of viral proteins
 - (4) Non-clathrin coated vesicles
25. Which of the following statements about cytokine receptors is NOT correct?
- (1) Upon activation by ligand binding, dimerization of receptor occurs
 - (2) Activates JAK associated with the receptors in the cytosolic domain
 - (3) Autophosphorylation occurs on the cytosolic domain
 - (4) Phosphorylation occurs on histidine/proline residues

26. Match the components of Column-A (*Scientists*) with components in Column-B (*Discoveries*)

Column-A

- a) Shinya Yamanaka
- b) Banting and Macleod
- c) James Allison and Tasuku Honjo
- d) George Snell, Jean Dausett and Baruj Benaceraff

Column-B

- i) Immune checkpoint blockade therapy
- ii) iPSC
- iii) Major histocompatibility complex
- iv) Insulin

Codes:

- (1) a – ii, b – iii, c – iv, d – i
- (2) a – ii, b – iv, c – iii, d – i
- (3) a – ii, b – iv, c – i, d – iii
- (4) a – iv, b – ii, c – iii, d – i

27. In neurotransmission, the movements of impulse across nerve cell is facilitated by

- (1) Ligand-gated K^+ channel
- (2) Voltage-gated Na^+ channel
- (3) Mechanical-gated Na^+ channel
- (4) Voltage-gated Ca^{2+} channel

28. Which of the following statements about p53 is NOT correct?

- (1) It is a tumor suppressor gene
- (2) It is a pro-apoptotic gene
- (3) It is induced by MDM_2
- (4) It activates the pro-apoptotic protein BAX

29. Consider the following Statements-I and II regarding major histocompatibility complex.

Statement-I : MHC Class I has peptide binding cleft that can bind 8-10 antigenic peptides.

Statement-II : Antigen processing for MHC Class I molecules involves the proteolytic machinery called 26S proteasome

Which one of the following is correct in respect of the above statements?

- (1) Statement-I is correct and Statement-II is incorrect
- (2) Statement-II is correct and Statement-I is incorrect
- (3) Both Statements-I and II are correct
- (4) Both Statements-I and II are incorrect

30. Match the following:

List-A

- a) Rheumatoid arthritis
- b) Celiac disease
- c) Multiple sclerosis
- d) Myasthenia gravis

List-B

- i) Muscle fatigue
- ii) Nerve damage
- iii) Gluten-sensitive
- iv) Joint pain

Codes:

(1) a – ii, b – iii, c – iv, d – i

(2) a – iii, b – iv, c – i, d – ii

(3) a – iv, b – iii, c – ii, d – i

(4) a – iv, b – iii, c – i, d – ii

31. Match List-I (Type of placenta) with List-II (Example) and select the correct answer using the codes given below:

List-I

- a) Epitheliochorial
- b) Syndesmochorial
- c) Endotheliochorial
- d) Hemochorial

List-II

- i) Dog
- ii) Human
- iii) Pig
- iv) Deer

Codes:

(1) a – i, b – ii, c – iii, d – iv

(2) a – iii, b – iv, c – i, d – ii

(3) a – ii, b – iv, c – iii, d – i

(4) a – iv, b – ii, c – i, d – iii

32. The correct sequence of morphogenetic phases of development in the sporangium of Dictyostelium is

- (1) Culmination, cell sorting, chemotaxis, aggregation
- (2) Chemotaxis, aggregation, cell sorting, culmination
- (3) Aggregation, chemotaxis, culmination, cell sorting
- (4) Cell sorting, chemotaxis, culmination, aggregation

33. Mesomere somite gives rise to

- (1) Digestive system
- (2) Muscular system
- (3) Respiratory system
- (4) Nervous system

34. Match List-I (Name of the plant) with List-II (Type of seeds to which the given plants belong) and select the correct answer using the codes given below the lists.

List-I

- a) Orchid
- b) Mango
- c) Barley
- d) Castor

List-II

- i) Dicotyledonous and albuminous
- ii) Monocotyledonous and albuminous
- iii) Dicotyledonous and exalbuminous
- iv) Monocotyledonous and exalbuminous

Codes:

(1) a – iv, b – iii, c – ii, d – i

(2) a – i, b – ii, c – iii, d – iv

(3) a – ii, b – i, c – iv, d – iii

(4) a – iii, b – i, c – ii, d – iv

35. The quiescent centre in the root meristem serves as a

- (1) Site for storage of food which is utilized during maturation
- (2) Reservoir of growth hormones
- (3) Reserve for replenishment of damaged cells of the meristem
- (4) Region for absorption of water

36. Consider the following statements:

Statement-I : Enlargement of an organ or tissue due to increase in the size of its cells is called Hypertrophy

Statement-II : Increased cell production in a healthy tissue or organ is called Hyperplasia

Which one of the following is correct in respect of the above statements?

- (1) Statement-I and Statement-II are correct and Statement-II is related to Statement-I
- (2) Statement-I and Statement-II are correct but Statement-II is not related to Statement-I
- (3) Statement-I is correct but Statement-II is incorrect
- (4) Statement-I is incorrect but Statement-II is correct

37. Which of the following factors is known to be involved in postponing programmed cell death in cereal aleurone until endosperm mobilization is complete?

- (1) Gibberrellic acid
- (2) Abscissic acid
- (3) Acidic pH of the vacuole
- (4) cGMP-mediated signal transduction pathway

38. Match the type of eggs in List-I with the corresponding organisms in the List-II

List-I	List-II
a) Alecithal egg	i) Bird
b) Mesolecithal egg	ii) Amphioxus
c) Microlecithal egg	iii) Eutherian mammals
d) Telolecithal egg	iv) Dipnoi

Codes:

- | | |
|------------------------------------|------------------------------------|
| (1) a – i, b – ii, c – iii, d – iv | (2) a – iv, b – iii, c – ii, d – i |
| (3) a – iii, b – iv, c – ii, d – i | (4) a – ii, b – i, c – iii, d – iv |

39. Cardiac activity could be moderated by the autonomous nervous system. From the given statements, choose the correct answer.

- (1) The parasympathetic system stimulates heart rate and stroke volume.
- (2) The sympathetic system stimulates heart rate and stroke volume
- (3) The parasympathetic system decreases the heart rate but increases the stroke volume
- (4) The sympathetic system decreases the heart rate but increases the stroke volume

40. Match Column-A having glands with Column-B having secretions and choose the correct answer.

Column-A (Glands)	Column-B (Secretions)
a) Liver	i) Amylase
b) β -cells of pancreas	ii) Peptidase
c) Duodenum	iii) Insulin
d) Parotid gland	iv) Stercobilin

Codes:

- | | |
|------------------------------------|------------------------------------|
| (1) a – iv, b – iii, c – ii, d – i | (2) a – ii, b – iv, c – i, d – iii |
| (3) a – iii, b – ii, c – iv, d – i | (4) a – i, b – ii, c – iii, d – iv |

41. Which of the following statements are correct with respect to the behaviour of animals in relation to their environment?

- a) Poikilo-osmotic animals show osmotic dependence with respect to the environment.
- b) Homo-osmotic animals maintain body fluid concentrations constant irrespective of fluctuations in environmental concentrates.
- c) Euryhaline animals withstand aquatic media of a wide range of concentrations.
- d) Stenohaline animals survive within a wide range of salinities.

Codes:

- | | |
|----------------|----------------|
| (1) b, c and d | (2) a, b and d |
| (3) a, c and d | (4) a, b and c |

42. The receptors for detecting taste is called _____
- (1) Sensory receptors (2) Chemical receptors
(3) Olfactory receptors (4) Gustatory receptors
43. The main force driving the filtration process of the kidneys is the _____
- (1) Glomerular hydrostatic pressure (HPG)
(2) Capsular hydrostatic pressure (HPC)
(3) Glomerular osmotic pressure (OPG)
(4) Net filtration pressure (NFP)
44. Match the following with reference to diseases and glands associated:
- | List-I | List-II |
|----------------------|---------------------|
| a) Addison's disease | i) Pituitary |
| b) Tetany | ii) Thyroid |
| c) Acromegaly | iii) Adrenal cortex |
| d) Myxoedema | iv) Parathyroid |
- Codes:
- (1) a – iii, b – iv, c – i, d – ii (2) a – i, b – iii, c – ii, d – iv
(3) a – iv, b – ii, c – iii, d – i (4) a – ii, b – i, c – iv, d – iii
45. Acetylcholine is a neurotransmitter enabling communication between muscles and nerves. In case of an interruption between ACh and ACh receptor sites on the muscles, the condition is called
- (1) Botulism
(2) Multiple sclerosis
(3) Myasthenia gravis
(4) Guinien-Barre syndrome
46. The correct sequence required to stimulate the thyroid gland to produce its hormone is
- (1) TRH $\longrightarrow$ TSH $\longrightarrow$ T₃ and T₄
(2) TSH $\longrightarrow$ TRH $\longrightarrow$ T₃ and T₄
(3) T₃ and T₄ $\longrightarrow$ TRH $\longrightarrow$ TSH
(4) T₃ and T₄ $\longrightarrow$ TSH $\longrightarrow$ TRH
47. Which among the following statement/statements is/are correct with reference to "quantum yield"?
- a) The number of O₂ molecules released per photon of light in photosynthesis
b) The number of photons required to release one molecule of CO₂ in photosynthesis
c) The ratio of volume of CO₂ released to the volume of O₂ absorbed
d) Evolution of CO₂ as a result of oxidation of carbon containing compounds.
- (1) a and b only (2) b and c only
(3) c and d only (4) a only

48. Electrons from NADH enter the mitochondrial electron transport chain at the level of
- (1) Coenzyme Q
 - (2) NADH-Q reductase or complex I
 - (3) QH_2 -cytochrome-c-reductase or complex III
 - (4) Cytochrome-c-oxidase or complex IV
49. Consider the following statements:
- Statement-I : Conversion of inorganic nitrogen (NH_3) into organic nitrogen (amino acid) accompanied by amination and reduction at the keto group of organic acid.
- Statement-II : Transfer of amino group from glutamic acid to the keto position of the corresponding keto acid
- Choose the correct answer from the options given below.
- (1) Statement-I is correct but Statement-II is incorrect
 - (2) Statement-II is correct but Statement-I is incorrect
 - (3) Both the Statements-I and II are correct
 - (4) Both the Statements-I and II are incorrect
50. Match the plant hormones in Column-A with their bioassays in Column-B
- | Column-A | Column-B |
|-------------------|--|
| a) Auxins | i) Chlorophyll retention test |
| b) Gibberellins | ii) Avena curvature test |
| c) Cytokinins | iii) Barley endosperm test |
| d) Abscissic acid | iv) Rice seedling growth inhibition test |
- Codes:
- (1) a – i, b – ii, c – iii, d – iv
 - (2) a – iii, b – ii, c – i, d – iv
 - (3) a – ii, b – iii, c – i, d – iv
 - (4) a – ii, b – i, c – iv, d – iii
51. Which of the following functions is not associated with phytochrome?
- (1) Nyctinastic movement in Mimosa
 - (2) Seed germination in lettuce
 - (3) Stomatal opening
 - (4) Circadian rhythms
52. For a flaccid cell,
- (1) $\text{DPD} = \text{OP}$
 - (2) $\text{DPD} = \text{TP}$
 - (3) $\text{DPD} = \text{OP} - \text{TP}$
 - (4) $\text{DPD} = \text{OP} + \text{TP}$

53. Various theories have been proposed to explain the mechanism involved in the ascent of sap. Which of the following theories is not a physical force theory?

- (1) Capillarity theory
- (2) Root pressure theory
- (3) Imbibitional theory
- (4) Transpiration pull or cohesion tension theory

54. A plant's first line of defense against abiotic stress lies in the

- (1) Leaf
- (2) Root
- (3) Stem
- (4) Leaf apex

55. Which of the following is an intercalating agent?

- (1) Crystal Violet
- (2) Hoechst dye
- (3) Ethidium bromide
- (4) Eosine

56. Match the following disorders (List-I) and their causes (List-II):

List-I

- a) Down's syndrome
- b) Turner's syndrome
- c) Klinefelter syndrome
- d) Cri-du-chat syndrome

List-II

- i) Deletion on chromosome 5
- ii) Extra X chromosome in males
- iii) One X chromosome missing in females
- iv) Extra copy of chromosome 21

Codes:

- (1) a – iii, b – iv, c – i, d – ii
- (2) a – ii, b – iv, c – i, d – iii
- (3) a – iv, b – iii, c – ii, d – i
- (4) a – iii, b – iv, c – ii, d – i

57. In an experiment to study lac repressor and operator DNA binding, 20 μg of repressor and 100 ng of operator DNA (radiolabeled) were incubated in presence and absence of IPTG for 1 hour. After the incubation, the mixtures were filtered through nitrocellulose filter, washed, dried and autoradiographed. Which one of the samples would you expect to retain more DNA label on the filter paper?

- (1) Mixture with IPTG
- (2) Mixture without IPTG
- (3) Both the mixtures
- (4) None of the mixtures

58. Consider the two statements and state whether true or false:

Statement-I : QTLs are chromosome segments containing genes that control polygenic characters

Statement-II : QTLs can be mapped by examining the association between the inheritance of quantitative characteristics and genetic marker.

- (1) Both statements I and II are correct
- (2) Only Statement-I is correct
- (3) Only Statement-II is correct
- (4) Both statements I and II are false

59. Match the following:

List-I

- a) Plieotropic inheritance
- b) Polygenic inheritance
- c) Single nucleotide polymorphism
- d) Short tandem repeats

List-II

- i) Multiple gene control single character
- ii) QTL analysis
- iii) Paternity and forensic analysis
- iv) Single gene exhibit multiple phenotype

Codes:

- (1) a – iv, b – i, c – ii, d – iii
- (2) a – iii, b – i, c – iv, d – ii
- (3) a – iv, b – iii, c – ii, d – i
- (4) a – iv, b – ii, c – i, d – iii

60. Which of the following is an example of Epistasis?

- (1) Red green colour blindness
- (2) Fur colour of Labrador retrievers
- (3) MN blood groups in humans
- (4) Flower colours in *Mirabilis Jalapa*

61. The genetic phenomenon where a dominant allele does not completely mask the effects of a recessive allele is called

- (1) Incomplete dominance
- (2) Codominance
- (3) Epistasis
- (4) Over expression

62. Study of characteristics or 'phenotypes' that do not involve changes to the DNA sequences is _____

- (1) Eugenics
- (2) Molecular genetics
- (3) Epigenetics
- (4) Behavioural genetics

63. Which of the following region was designated as the 36th hot spot for biodiversity?

- (1) California floristic province
- (2) Mesoamerica
- (3) Madrean Pine-Oak woodlands
- (4) North American coastal plain

64. Which of the following is not an example for homologous organs?

- (1) Forelimb of frog and lizard
- (2) Thorns in bougainvillea and tendril in cucumber
- (3) Wing of insect and wing of bird
- (4) Forelimb of human and elephant

65. Which of the following is the zoonotic tapeworm parasitic disease?

- (1) Onchocerciasis
- (2) Echinococcosis
- (3) Cryptosporidiosis
- (4) Fascioliasis

66. Which of the following is a correct hierarchical sequence for classifying a living organism?

- (1) Kingdom – Domain – Phylum – Class – Order – Family – Genus – Species
- (2) Domain – Kingdom – Phylum – Class – Order – Family – Genus – Species
- (3) Domain – Kingdom – Phylum – Order – Class – Family – Genus – Species
- (4) Kingdom – Domain – Phylum – Order – Class – Family – Genus – Species

67. Match the List-A with List-B

List-I (Animals)

- a) Bengal Florican
- b) Ganga River Dolphin
- c) Indian Rhinoceros
- d) Asiatic Lion

List-II (Threat category)

- i) Critically endangered
- ii) Rare
- iii) Vulnerable
- iv) Endangered

Codes:

- (1) a – iv, b – ii, c – iii, d – i
- (2) a – ii, b – iii, c – iv, d – i
- (3) a – i, b – iv, c – iii, d – ii
- (4) a – iii, b – ii, c – iv, d – i

68. Madcow disease or bovine spongiform encephalopathy is a progressive and fatal neurological disorder of cattle. This disease is caused by

- (1) Prion
- (2) Salmonella
- (3) Lyssavirus
- (4) Vesiculovirus

69. Match the disease in List – I with their causal organism in List – II.

List-I

- a) Blast disease of rice
- b) Late blight of potato
- c) Downy mildew of grapes
- d) Powdery mildew of mulberry

List-II

- i) *Phyllactinia corylea*
- ii) *Plasmopara viticola*
- iii) *Phytophthora infestans*
- iv) *Pyricularia oryzae*

Codes:

- (1) a – iv, b – iii, c – ii, d – i
- (2) a – i, b – ii, c – iv, d – iii
- (3) a – iv, b – ii, c – iii, d – i
- (4) a – i, b – ii, c – iii, d – iv

70. The fungus containing both sexual and asexual reproduction is called

- (1) Anamorphic fungus
- (2) Telomorphic fungus
- (3) Holomorphic fungus
- (4) Polymorphic fungus

71. Match the type of desert ecosystems given in List – I with the examples given in List – II.

List-I

- a) Hot-dry desert ecosystem
- b) Semi-arid desert ecosystem
- c) Coastal desert ecosystem
- d) Cold desert ecosystem

List-II

- i) Atacama desert
- ii) Greenland
- iii) Great Basin
- iv) South Asia

Codes:

- (1) a – i, b – iv, c – iii, d – ii
- (3) a – ii, b – iii, c – i, d – iv

- (2) a – iv, b – iii, c – i, d – ii
- (4) a – iv, b – i, c – iii, d – ii

72. A urn-shaped pyramid in a population signifies

- (1) Young population
- (2) Declining population
- (3) Stable population
- (4) Endangered population

73. Which of the following is not an example for negative interaction?

- (1) Amensalism
- (2) Competition
- (3) Predation
- (4) Protocooperation

74. Consider the following statements:

Statement I : The growth of epiphytes on trees is an example for commensalism.

Statement II : In commensalism, one of the partners is parasitic in nature, which depends on its host for nutrition

Which one of the following is correct answer in respect of above statements?

- (1) Statement I is correct and Statement II is incorrect
- (2) Both statements I and II are correct
- (3) Both statements I and II are incorrect
- (4) Statement II is correct and Statement I is incorrect

75. The term 'synecology' was coined by

- (1) Carl Mobius
- (2) Schroeter and Kirchner
- (3) Carl Friedrich von Weizsäcker
- (4) Whittaker and Thomson

76. Which of the following bacteria can oxidize ammonium compounds to soluble nitrites?

- | | |
|-----------------|-----------------|
| (1) Azotobacter | (2) Nitrocystis |
| (3) Rhizobium | (4) Nitrococcus |

77. Match the List – I (Protected areas) with List-II (State) and select the correct codes:

- | List-I | List-II |
|-----------------------|------------------|
| a) Nagarahole Reserve | i) Gujarat |
| b) Rann of Kutch | ii) Karnataka |
| c) Gulf of Mannar | iii) West Bengal |
| d) Sundarbans | iv) Tamil Nadu |

Codes:

- | | |
|------------------------------------|------------------------------------|
| (1) a – iv, b – iii, c – i, d – ii | (2) a – iv, b – iii, c – ii, d – i |
| (3) a – iii, b – i, c – iv, d – ii | (4) a – ii, b – i, c – iv, d – iii |

78. Choose the correct statements :

- I. Biosphere is a part of ecosystem
- II. Light is a biotic factor in an ecosystem
- III. Nectons are active swimming organisms
- IV. A food chain may be parasitic or saprophytic

- | | |
|-----------------|----------------|
| (1) I, III, IV | (2) I, II, IV |
| (3) II, III, IV | (4) I, II, III |

79. When two related populations occupy geographically or spatially separated areas, the phenomenon is called

- | | |
|---------------------------|---------------------------|
| (1) Allopatric speciation | (2) Sympatric speciation |
| (3) Quantum speciation | (4) Parapatric speciation |

80. Consider the following statements regarding sibling species exhibit:

- | | |
|---------------------------|------------------------------|
| I. Sympatric distribution | II. Morphological similarity |
| III. Genetic identity | IV. Reproductive isolation |

Choose the correct answer from the following options.

- | | |
|--------------------------------|------------------------------|
| (1) Only III is correct | (2) I and II are correct |
| (3) II, III and IV are correct | (4) I, II and IV are correct |

81. Consider the given statements:

Statement I : Adaptive radiation is the evolution of a group of animals in different directions

Statement II : Adaptive radiation results in divergence or diversification

Which one of the following is correct in respect of the above statements?

- (1) Both the statements are incorrect
- (2) Statement I is correct and Statement II is incorrect
- (3) Both the statements are correct
- (4) Statement I is incorrect and Statement II is correct

82. Match the List-I with List-II and select the correct answer using the codes given below:

List-I

- a) The sum total of genes present in a Mendelian population
- b) Transfer of genes from one gene pool to another
- c) Appearance of a specific allele within a population
- d) Inward migration

List-II

- i) Immigration
- ii) Gene frequency
- iii) Gene pool
- iv) Gene flow

Codes:

- (1) a – iii, b – iv, c – ii, d – i
- (2) a – i, b – ii, c – iii, d – iv
- (3) a – iii, b – iv, c – i, d – ii
- (4) a – iv, b – iii, c – ii, d – i

83. Which one of these is/are the method/methods to determine the dating of fossils?

- a) Biostratigraphy
- b) Radiometry
- c) Fossilium
- d) Biofossilium

- (1) c and d only
- (2) b only
- (3) c only
- (4) a only

84. Random change in allele frequencies within a population due to chance events is _____

- (1) Recombination
- (2) Gene flow
- (3) Genetic drift
- (4) Selection

85. Consider the following statements

Statement-I : Communication is a behaviour that influences the actions of other individuals

Statement-II : Natural selection shapes, displays or signals into system of communication

Which one of the following is correct in respect of the above statements?

- (1) Both the statements-I and II are correct and the Statement-II is related to Statement-I
- (2) Both the statements-I and II are correct, but Statement-II is not related to Statement-I
- (3) Statement-I is correct, but Statement-II is incorrect
- (4) Statement-I is incorrect, but Statement-II is correct

86. Which of the following is used as buffering agent in RPMI and DMEM medium?

- (1) HEPES (2) NaHCO_3
(3) Glutamine (4) HEPES and NaHCO_3

87. Which one of the following is not considered as a biodiversity hot spot in India?

- (1) Eastern and Western Himalayas
(2) Western Ghats
(3) Thar Desert
(4) Indo-Burma Region

88. In glucose electrode, glucose oxidase is immobilised using _____

- (1) Ferrocene derivative (2) Polyacrylamide
(3) FITC (4) Urea

89. Match the following

Genes cloned

- a) psy and Crt L
b) Cry1Ac, Cry2Ab
c) RNA_i
d) Growth hormone

GM products

- i) Tomato
ii) Salmon
iii) Cotton
iv) Rice

Codes:

- (1) a – iv, b – iii, c – i, d – ii (2) a – iii, b – iv, c – ii, d – i
(3) a – ii, b – i, c – iv, d – iii (4) a – iii, b – iv, c – i, d – ii

90. Consider the statements-I and II and state if true or false

Statement-I : Xanthan gum is a food additive and non-toxic

Statement-II : Xanthan gum is produced by *Xanthomonas compestris*

- (1) Both statements I and II are correct
(2) Statement-II is correct and Statement I is incorrect
(3) Statement-I is correct and Statement II is incorrect
(4) Both Statements-I and II are incorrect

91. Enzymes linked to a biotinylated second antibody to detect a primary antibody/protein in blotting are usually

- (1) β -galactosidase and glucose oxidase
(2) Horseradish peroxidase and alkaline phosphatase
(3) Horseradish peroxidase and glucose oxidase
(4) β -galactosidase and alkaline phosphatase

92. Recombinant Hepatitis B vaccine is produced in which organism?
 (1) E.coli (2) Yeast
 (3) Microsporium (4) Salmonella
93. The commonly used chemical on single-stranded DNA for random chemical mutagenesis is
 (1) Sodium oxalates (2) Sodium bisulphites
 (3) Sodium bicarbonates (4) Sodium hydroxide
94. A fragment of foreign DNA (50 kl) was inserted into multiple cloning site of a PUC vector. The recombinant transformants were selected on a x-gal containing medium. If colonies appeared colourless, then which one of the following is an appropriate conclusion?
 (1) β -galactosidase does not hydrolyse x-gal
 (2) Product of x-gal hydrolysis is colourless
 (3) Reading frame of x-gal is altered
 (4) Foreign DNA is not inserted into multiple cloning site
95. A certain purified DNA sample was cut with two restriction endonucleases RE_1 and RE_2 . The following results were obtained from Agarose gel electrophoresis:
 • Sample cut with RE_1 alone, two bands of size 70 Kb and 30 Kb.
 • Sample cut with RE_2 alone, two bands of size 80 Kb and 20 Kb.
 • Sample cut simultaneously with RE_1 and RE_2 , three bands of size 70 Kb, 20 Kb and 10 Kb.
 From these data, it can be inferred that the DNA has
 (1) One site each for RE_1 and RE_2
 (2) One site for RE_1 and two sites for RE_2
 (3) Three sites for RE_1 and one site for RE_2
 (4) Two sites for RE_1 and one site for RE_2
96. Match the correct sequence of diagnostic terms shown in Column-A with the functions shown in Column-B
- | Column-A
(Terms) | Column-B
(Functions) |
|---------------------|--|
| a) fMRI | i) Records electrical activity of heart |
| b) CAT | ii) Uses a small amount of radioactive material to visualise and assess metabolic activity |
| c) PET | iii) Produces cross-sectional images of body using X-rays and computer |
| d) ECG | iv) Measures brain activity in specific areas by detecting changes in blood flow |
- Codes:
 (1) a – ii, b – iv, c – iii, d – i
 (2) a – i, b – iii, c – iv, d – ii
 (3) a – iii, b – iv, c – ii, d – i
 (4) a – iv, b – iii, c – ii, d – i

97. An investigation of cholesterol level (units/ml) of nine patients is

90, 145, 270, 166, 160, 155, 245, 500, 340:

Find the median.

(1) 160

(2) 166

(3) 155

(4) 245

98. Polysomnography (PSG) test is used to study

(1) Biological rhythms

(2) Sleep

(3) Jetlags

(4) Fetal growth

99. Match Column-A with Column-B and select the correct answer:

Column-A

Column-B

a) X-ray crystallography

i) Cell surface and larger objects

b) Phase contrast microscope

ii) Examines unstained and dividing cells

c) SEM

iii) Separation of subcellular components

d) Centrifugation

iv) Spatial arrangement of atoms on molecules

Codes:

(1) a – iii, b – iv, c – ii, d – i

(2) a – ii, b – i, c – iii, d – iv

(3) a – i, b – iii, c – iv, d – ii

(4) a – iv, b – ii, c – i, d – iii

100. Consider the following statements:

Statement-I : The patch clamp technique is used to study the ionic currents in isolated living cells, tissue sections or patches of cell membrane

Statement-II : The patch clamp techniques cannot be used to study ionic currents in excitable cells.

(1) Both Statement-I and Statement-II are correct

(2) Both Statement-I and Statement-II are incorrect

(3) Statement-I is correct, but Statement-II is incorrect

(4) Statement-II is correct, but Statement-I is incorrect

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