NEET 2023 Manipur — Biology Question Paper with Solutions

97 Biology questions as set in the paper · answers checked by RankUp

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1. Match List - I with List - II

List - I | List - II

(A) Protein (I) C=C double bonds

(B) Unsaturated fatty acid (II) Phosphodiester bond

(C) Nucleic acid (III) Glycosidic bonds

(D) Polysaccharide (IV) Peptide bonds

Choose the correct answer from the options given below :

(A) (A)-(II), (B)-(I), (C)-(IV), (D)-(III)
(B) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)
(C) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)
(D) (A)-(I), (B)-(IV), (C)-(III), (D)-(II)

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2. Match List - I with List - II

List - I | List - II

(A) Hydrarch succession (I) Gradual change in the species composition

(B) Xerarch succession (II) Faster and climax reached quickly

(C) Ecological succession (III) Lichens to mesic conditions

(D) Secondary succession (IV) Phytoplankton to mesic conditions

Choose the correct answer from the options given below :

(A) (A)-(IV), (B)-(II), (C)-(III), (D)-(I)
(B) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
(C) (A)-(I), (B)-(IV), (C)-(II), (D)-(III)
(D) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)

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3. In Calotropis, aestivation is :

(A) Valvate
(B) Vexillary
(C) Imbricate
(D) Twisted

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4. Match List - I with List - II.

List - I | List - II

(A) Chlorophyll a (I) Yellow to yellow orange

(B) Chlorophyll b (II) Yellow green

(C) Xanthophyll (III) Blue green

(D) Carotenoid (IV) Yellow

Choose the correct answer from the options given below :

(A) (A)-(III), (B)-(II), (C)-(IV), (D)-(I)
(B) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
(C) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)
(D) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)

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5. Match List - I with List - II.

List - I | List - II

(A) Monohybrid Cross (I) 1 : 1

(B) Dihybrid Cross (II) 1 : 2 : 1

(C) Incomplete dominance (III) 3 : 1

(D) Test Cross (IV) 9 : 3 : 3 : 1

Choose the correct answer from the options given below :

(A) (A)-(III), (B)-(IV), (C)-(II), (D)-(I)
(B) (A)-(II), (B)-(IV), (C)-(III), (D)-(I)
(C) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
(D) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)

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6. How many times decarboxylation occurs during each TCA cycle?

(A) Thrice
(B) Many
(C) Once
(D) Twice

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7. The dissolution of synaptonemal complex occurs during :

(A) Pachytene
(B) Diplotene
(C) Diakinesis
(D) Leptotene

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8. Given below are two statements :

Statement I : RuBisCO is the most abundant enzyme in the world.

Statement II : Photorespiration does not occur in C_4 plants.

In the light of the above statements, choose the most appropriate answer from the options given below :

(A) Statement I is correct but Statement II is incorrect
(B) Statement I is incorrect but Statement II is correct
(C) Both Statement I and Statement II are correct
(D) Both Statement I and Statement II are incorrect

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9. In 'rivet popper hypothesis', Paul Ehrlich compared the rivets in an airplane to :

(A) species within a genus
(B) genetic diversity
(C) ecosystem
(D) genera within a family

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10. In a pea flower, five petals are arranged in a specialized manner with one posterior, two lateral and two anterior. These are named as _____, _____ and _____ respectively.

(A) Keel, Wings and Standard
(B) Vexillum, Keel and Standard
(C) Keel, Standard and Carina
(D) Standard, Wings and Keel

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11. In which of the following sets of families, the pollen grains are viable for months?

(A) Solanaceae, Poaceae and Liliaceae
(B) Brassicaceae, Liliaceae and Poaceae
(C) Rosaceae, Liliaceae and Poaceae
(D) Leguminosae, Solanaceae and Rosaceae

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12. Transfer of pollen grains from anther to stigma of another flower of same plant is known as :

(A) Geitonogamy
(B) Xenogamy
(C) Autogamy
(D) Cleistogamy

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13. The phenomenon which is influenced by auxin and also played a major role in its discovery :

(A) Phototropism
(B) Root initiation
(C) Gravitropism
(D) Apical Dominance

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14. The transverse section of a plant part showed polyarch, radial and exarch xylem, with endodermis and pericycle. The plant part is identified as :

(A) Monocot root
(B) Dicot root
(C) Dicot stem
(D) Monocot stem

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15. The last chromosome sequenced in Human Genome Project was:

(A) Chromosome 6
(B) Chromosome 1
(C) Chromosome 22
(D) Chromosome 14

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16. The amount of nutrients such as carbon, nitrogen, potassium and calcium present in the soil at any given time is referred to as :

(A) Standing state
(B) Standing crop
(C) Humus
(D) Detritus

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17. Plants offer rewards to animals in the form of pollen and nectar and the animals facilitate the pollination process. This is an example of :

(A) Amensalism
(B) Competition
(C) Commensalism
(D) Mutualism

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18. The species of plants that plays a vital role in controlling the relative abundance of other species in a community is called _____.

(A) alien species
(B) endemic species
(C) exotic species
(D) keystone species

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19. Match List - I with List - II.

List - I | List - II

(A) Pteropsida (I) Psilotum
(B) Lycopsida (II) Equisetum
(C) Psilopsida (III) Adiantum
(D) Sphenopsida (IV) Selaginella

Choose the correct answer from the options given below :

(A) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)
(B) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
(C) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
(D) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

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20. Inulin is a polymer of :

(A) Fructose
(B) Galactose
(C) Amino acids
(D) Glucose

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21. Thermostable DNA polymerase used in PCR was isolated from :

(A) Thermus aquaticus
(B) Escherichia coli
(C) Agrobacterium tumifaciens
(D) Bacillus thuringiensis

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22. Name the component that binds to the operator region of an operon and prevents RNA polymerase from transcribing the operon.

(A) Promotor
(B) Regulator protein
(C) Repressor protein
(D) Inducer

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23. A heterozygous pea plant with violet flowers was crossed with homozygous pea plant with white flower. Violet is dominant over white. Which one of the following represents the expected combinations among 40 progenies formed?

(A) 30 produced violet and 10 produced white flowers
(B) 20 produced violet and 20 produced white flowers
(C) All 40 produced violet flowers
(D) All 40 produced white flowers

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24. Fatty acids are connected with the respiratory pathway through :

(A) Acetyl CoA
(B) α-Ketoglutaric acid
(C) Dihydroxy acetone phosphate
(D) Pyruvic acid

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25. Ligation of foreign DNA at which of the following site will result in loss of tetracyclin resistance of pBR322 :

(A) Pst I
(B) Pvu I
(C) EcoR I
(D) BamH I

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26. Match List - I with List - II.

List - I | List - II

(A) Auxin (I) Promotes female flower formation in cucumber
(B) Gibberellin (II) Overcoming apical dominance
(C) Cytokinin (III) Increase in the length of grape stalks
(D) Ethylene (IV) Promotes flowering in pineapple

Choose the correct answer from the options given below :

(A) (A)-(II), (B)-(I), (C)-(IV), (D)-(III)
(B) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)
(C) (A)-(I), (B)-(III), (C)-(IV), (D)-(II)
(D) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)

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27. Which classes of algae possess pigment fucoxanthin and pigment phycoerythrin, respectively ?

(A) Phaeophyceae and Chlorophyceae
(B) Phaeophyceae and Rhodophyceae
(C) Chlorophyceae and Rhodophyceae
(D) Rhodophyceae and Phaeophyceae

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28. In which disorder change of single base pair in the gene for beta globin chain results in change of glutamic acid to valine ?

(A) Thalassemia
(B) Sickle cell anemia
(C) Haemophilia
(D) Phenylketonuria

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29. For chemical defence against herbivores, Calotropis has :

(A) cardiac glycosides
(B) strychnine
(C) toxic ricin
(D) distasteful quinine

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30. Consider the following tissues in the stelar region of a stem showing secondary growth.

(A) Primary xylem
(B) Secondary xylem
(C) Primary phloem
(D) Secondary phloem

Arrange these in the correct sequence of their position from pith towards cortex.

(A) (A), (B), (D), (C)
(B) (B), (A), (C), (D)
(C) (A), (B), (C), (D)
(D) (B), (A), (D), (C)

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31. Which out of the following statements is incorrect?

(A) Grana lamellae have both PS I and PS II
(B) Cyclic photophosphorylation involves both PS I and PS II
(C) Both ATP and NADPH + H^+ are synthesised during non-cyclic photophosphorylation.
(D) Stroma lamellae lack PS II and NADP reductase

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32. In angiosperms the correct sequence of events in formation of female gametophyte in the ovule is :

(A) 3 successive free nuclear divisions in functional megaspore.
(B) Degeneration of 3 megaspores.
(C) Meiotic division in megaspore mother cell.
(D) Migration of 3 nuclei towards each pole.
(E) Formation of wall resulting in seven celled embryosac.

Choose the correct answer from the options given below :

(A) (A), (B), (C), (D), (E)
(B) (C), (E), (A), (D), (B)
(C) (B), (C), (A), (D), (E)
(D) (C), (B), (A), (D), (E)

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33. Which of the following statements is true?

(A) All pteridophytes exhibit haplo-diplontic pattern.
(B) Seed bearing plants follow haplontic pattern
(C) Most algal genera are diplontic
(D) Most bryophytes do not have haplo-diplontic life cycle.

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34. Which of the following statement is incorrect about Agrobacterium tumifaciens?

(A) It is used to deliver gene of interest in both prokaryotic as well as eukaryotic host cells.
(B) 'Ti' plasmid from Agrobacterium tumifaciens used for gene transfer is not pathogenic to plant cell.
(C) It transforms normal plant cells into tumor cells.
(D) It delivers 'T-DNA' into plant cell.

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35. Consider the following plant tissues :

(A) Axillary buds
(B) Fascicular vascular cambium
(C) Interfascicular cambium
(D) Cork cambium
(E) Intercalary meristem

Identify the lateral meristems among the above.

(A) (A), (C) and (D) only
(B) (B), (C) and (D) only
(C) (A), (B), (C) and (E) only
(D) (A), (B), (D) and (E) only

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36. Given below are two statements :
Statement I : The process of copying genetic information from one strand of the DNA into RNA is termed as transcription.
Statement II : A transcription unit in DNA is defined primarily by the three regions in the DNA i.e., a promotor, the structural gene and a terminator.
In the light of the above statements, choose the correct answer from the options given below :

(A) Statement I is true but Statement II is false
(B) Statement I is false but Statement II is true
(C) Both Statement I and Statement II are true
(D) Both Statement I and Statement II are false

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37. Which scientist conducted an experiment with ^{32}P and ^{35}S labelled phages for demonstrating that DNA is the genetic material?

(A) james D. Watson and F.H. C. Crick
(B) A. D Hershey and M.J. Chase
(C) F. Griffith
(D) O.T. Avery, C.M. MacLeod and M. McCarty

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38. A certain plant homozygous for yellow seeds and red flowers was crossed with a plant homozygous for green seeds and white flowers. The F_1 plants had yellow seeds and pink flowers. The F_1 plants were selfed to get F_2 progeny. Assuming independent assortment of the two characters, how many phenotypic categories are expected for these characters in the F_2 generation ?

(A) 9
(B) 16
(C) 4
(D) 6

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39. During which stages of mitosis and meiosis, respectively does the centromere of each chromosome split ?

(A) Metaphase, Metaphase II
(B) Prophase, Telophase I
(C) Telophase, Anaphase I
(D) Anaphase, Anaphase II

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40. Which of the following statements is not correct ?

(A) Phase of cell elongation of plant cells is characterized by increased vacuolation.
(B) Cells in the meristematic phase of growth exhibit abundant plasmodesmatal connections.
(C) Plant growth is generally determinate.
(D) Plant growth is measurable.

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41. Match the following :

Type of flower | Example

(A) Zygomorphic (I) Mustard

(B) Hypogynous (II) Plum

(C) Perigynous (III) Cassia

(D) Epigynous (IV) Cucumber

Select the correct option :

(A) (A)-(I), (B)-(II), (C)-(IV), (D)-(III)
(B) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
(C) (A)-(IV), (B)-(I), (C)-(III), (D)-(II)
(D) (A)-(III), (B)-(I), (C)-(II), (D)-(IV)

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42. Which of the following sexually transmitted infections are completely curable ?

(A) HIV infection and Trichomoniasis
(B) Syphilis and trichomoniasis
(C) Hepatitis – B and Genital herpes
(D) Genital herpes and Genital warts

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43. Match List - I with List - II.

List - I | List - II

(A) Typhoid (I) Protozoan

(B) Elephantiasis (II) Salmonella

(C) Ringworm (III) Aschelminthes

(D) Malaria (IV) Microsporum

Choose the correct answer from the options given below :

(A) (A)-(I), (B)-(IV), (C)-(III), (D)-(II)
(B) (A)-(I), (B)-(III), (C)-(IV), (D)-(II)
(C) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
(D) (A)-(II), (B)-(IV), (C)-(III), (D)-(I)

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44. Which of the following is not a secondary metabolite?

(A) Curcumin
(B) Morphine
(C) Anthocyanin
(D) Lecithin

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45. House fly belongs to _____ family.

(A) Cyprinidae
(B) Hominidae
(C) Calliphoridae
(D) Muscidae

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46. Select incorrect statement, regarding chemical structure of insulin.

(A) Mature insulin molecule consists of three polypeptide chains-A, B and C.
(B) Insulin is synthesized as prohormone which contains extra stretch of C-peptide.
(C) C-peptide is not present in mature insulin molecule.
(D) Polypeptide chains A and B are linked by disulphide bridges.

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47. Which one of the following is the quiescent stage of cell cycle?

(A) M
(B) G_2
(C) G_1
(D) G_0

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48. Given below are two statements :
Statement I : RNA being unstable, mutate at a faster rate.
Statement II : RNA can directly code for synthesis of proteins hence can easily express the characters.
In the light of the above statements, choose the correct answer from the options given below :

(A) Statement I is correct but Statement II is false
(B) Statement I is incorrect but Statement II is true
(C) Both Statement I and Statement II are true
(D) Both Statement I and Statement II are false

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49. Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R)
Assertion (A) : Ascending limb of loop of Henle is impermeable to water and allows transport of electrolytes actively or passively.
Reason (R) : Dilution of filtrate takes place due to efflux of electrolytes in the medullary fluid.
In the light of the above statements, choose the correct answer from the options given below :

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

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50. The Cockroach is :

(A) Ammonotelic only
(B) Uricotelic only
(C) Ureotelic only
(D) Ureotelic and Uricotelic

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51. Select the sequence of steps in Respiration.
(A) Diffusion of gases (O_2 and CO_2) across alveolar membrane.
(B) Diffusion of O_2 and CO_2 between blood and tissues.
(C) Transport of gases by the blood
(D) Pulmonary ventilation by which atmospheric air is drawn in and CO_2 rich alveolar air is released out.
(E) Utilisation of O_2 by the cells for catabolic reactions and resultant release of CO_2
Choose the correct answer from the options given below :

(A) (D), (A), (C), (B), (E)
(B) (C), (B), (A), (E), (D)
(C) (B), (C), (E), (D), (A)
(D) (A), (C), (B), (E), (D)

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52. Which of the following is/are cause(s) of biodiversity losses ?

(A) Over-exploitation, habitat loss and fragmentation.
(B) Climate change only
(C) Over-Exploitation only
(D) Habitat loss and fragmentation only

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53. Match List-I with List-II.

List - I | List - II

(A) Contractile vacuole (I) Asterias
(B) Water vascular system (II) Amoeba
(C) Canal system (III) Spongilla
(D) Flame cells (IV) Taenia

Choose the correct answer from the options given below :

(A) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)
(B) (A)-(I), (B)-(III), (C)-(II), (D)-(IV)
(C) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)
(D) (A)-(II), (B)-(I), (C)-(III), (D)-(IV)

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54. Match List-I with List-II.

List - I | List - II

(A) Palm bones (I) Phalanges
(B) Wrist bones (II) Metacarpals
(C) Ankle bones (III) Carpals
(D) Digit bones (IV) Tarsals

Choose the correct answer from the options given below :

(A) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)
(B) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)
(C) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)
(D) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)

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55. Match List - I with List - II.

List - I | List - II

(A) Non-medicated IUDs (I) Multiload 375
(B) Copper releasing IUDs (II) Rubber barrier
(C) Hormone releasing IUDs (III) Lippes loop
(D) Vaults (IV) LNG-20

Choose the correct answer from the options given below :

(A) A-(IV), B-(III), C-(I), D-(II)
(B) A-(II), B-(IV), C-(III), D-(I)
(C) A-(III), B-(I), C-(IV), D-(II)
(D) A-(III), B-(IV), C-(II), D-(I)

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56. Which of the following can act as molecular scissors?

(A) Restriction enzymes
(B) DNA ligase
(C) RNA polymerase
(D) DNA polymerase

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57. Select the correct statements about sickle cell anaemia.

(A) There is a change in gene for beta globin.

(B) In the beta globin, there is valine in the place of Lysine.

(C) It is an example of point mutation.

(D) In the normal gene U is replaced by A.

Choose the correct answer from the options given below :

(A) (B), (C) and (D) only

(B) (B) and (D) only

(C) (A), (B) and (D) only

(D) (A) and (C) only

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58. Given below are two statements :

Statement I :- Intra Cytoplasmic Sperm Injection (ICSI) is another specialised procedure of in-vivo fertilisation.

Statement II :- Infertility cases due to inability of the male partner to inseminate female can be corrected by artificial insemination (AI).

In the light of the above statements, choose the correct answer from the options given below:

(A) Statement I is correct but statement II is false

(B) Statement I is incorrect but Statement II is true

(C) Both Statement I and Statement II are true

(D) Both Statement I and Statement II are false.

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59. Match List-I with List-II.

List - I (ECG) | List - II (Electrical activity of heart)

(A) P-wave (I) Depolarisation of ventricles

(B) QRS complex (II) End of systole

(C) T wave (III) Depolarisation of atria

(D) End of T wave (IV) Repolarisation of ventricles

Choose the correct answer from the options given below :

(A) A-(IV), B-(I), C-(III), D-(II)

(B) A-(I), B-(IV), C-(III), D-(II)

(C) A-(IV), B-(III), C-(I), D-(II)

(D) A-(III), B-(I), C-(IV), D-(II)

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60. Match List-I with List-II.

List - I | List - II

(A) Eosinophils (I) 6 - 8%

(B) Lymphocytes (II) 2 - 3%

(C) Neutrophils (III) 20 - 25%

(D) Monocytes (IV) 60 - 65%

Choose the correct answer from the options given below :

(A) A-(IV), B-(I), C-(II), D-(III)

(B) A-(IV), B-(I), C-(III), D-(II)

(C) A-(II), B-(III), C-(IV), D-(I)

(D) A-(II), B-(III), C-(I), D-(IV)

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61. Given below are two statements :
Statement I :- Goblet cells are unicellular glands.
Statement II :- Earwax is the secretion of exocrine gland.
In the light of the above statements, choose the correct answer from the options given below:

(A) Statement I is true but Statement II is false
(B) Statement I is false but Statement II is true
(C) Both Statement I and Statement II are true
(D) Both Statement I and Statement II are false.

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62. Given below are two statements regarding oogenesis:
Statement I :- The primary follicles get surrounded by more layers of granulosa cells, a theca and shows fluid filled cavity antrum. Now it is called secondary follicle.
Statement II :- Graafian follicle ruptures to release the secondary oocyte from the ovary by the process called ovulation.
In the light of the above statements, choose the correct answer from the options given below:

(A) Statement I is correct but Statement II is false.
(B) Statement I is incorrect but Statement II is true
(C) Both Statement I and Statement II are true
(D) Both Statement I and Statement II are false.

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63. If there are 250 snails in a pond, and within a year their number increases to 2500 by reproduction. What should be their birth rate per snail per year ?

(A) 10
(B) 9
(C) 25
(D) 15

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64. Which one of the following acts as an inducer for lac operon ?

(A) Sucrose
(B) Lactose
(C) Glucose
(D) Galactose

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65. 'X' and 'Y' are the components of Binomial nomenclature. This naming system was proposed by 'Z' :

(A) X-Generic name, Y-Specific epithet, Z-Carolus Linnaeus
(B) X-Specific epithet, Y-Generic name, Z-R.H. Whittaker
(C) X-Specific epithet, Y-Generic name, Z-Carolus Linnaeus
(D) X-Generic name, Y-Specific epithet, Z-R.H. Whittaker

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66. Which of the following statements are correct ?

(A) Reproductive health refers to total well-being in all aspects of reproduction.

(B) Amniocentesis is legally banned for sex determination in India.

(C) "Saheli" – a new oral contraceptive for females was developed in collaboration with ICMR (New Delhi).

(D) Amniocentesis is used to determine genetic disorders and survivability of foetus.

Choose the most appropriate answer from the options given below :

(A) (B) and (C) only
(B) (D) and (C) only
(C) (A), (B) and (D) only
(D) (A) and (C) only

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67. Match List-I with List-II.

List - I | List - II

(A) Terpenoids (I) Codeine

(B) Lectins (II) Diterpenes

(C) Alkaloids (III) Ricin

(D) Toxins (IV) Concanavalin A

Choose the correct answer from the options given below :

(A) A-(II), B-(IV), C-(III), D-(I)
(B) A-(II), B-(I), C-(IV), D-(III)
(C) A-(II), B-(III), C-(I), D-(IV)
(D) A-(II), B-(IV), C-(I), D-(III)

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68. Given below are two statements :

Statement I :- In bacteria, the mesosomes are formed by the extensions of plasma membrane.

Statement II :- The mesosomes, in bacteria, help in DNA replication and cell wall formation.

In the light of the above statements, choose the most appropriate answer from the options given below:

(A) Statement I is correct but Statement II is incorrect.
(B) Statement I is incorrect but Statement II is correct.
(C) Both Statement I and Statement II are correct.
(D) Both Statement I and Statement II are incorrect.

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69. Select correct sequence of substages of Prophase-I of Meiotic division :

(A) Zygotene

(B) Pachytene

(C) Diakinesis

(D) Leptotene

(E) Diplotene

Choose the correct answer from the options given below :

(A) (D), (B), (A), (E), (C)
(B) (A), (B), (D), (E), (C)
(C) (D), (A), (B), (E), (C)
(D) (A), (D), (B), (C), (E)

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70. Brainstem of human brain consists of :

(A) Mid-brain, Pons and Medulla Oblongata
(B) Forebrain, Cerebellum and Pons
(C) Thalamus, Hypothalamus and Corpora quadrigemina
(D) Amygdala, Hippocampus and Corpus Callosum

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71. Identify the fossil of man who showed the following characteristics.
(A) Brain capacity of 1400 cc
(B) Used hides to protect their body
(C) Buried their dead bodies
In the light of above statements, choose the correct answer from the options given below :

(A) Homo erectus
(B) Neanderthal man
(C) Homo habilits
(D) Australopithecus

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72. With reference to Hershey and Chase experiments. Select the correct statements.
(A) Viruses grown in the presence of radioactive phosphorus contained radioactive DNA.
(B) Viruses grown on radioactive sulphur contained radioactive proteins.
(C) Viruses grown on radioactive phosphorus contained radioactive protein.
(D) Viruses grown on radioactive sulphur contained radioactive DNA.
(E) Viruses grown on radioactive protein contained radioactive DNA.
Choose the most appropriate answer from the options given below :

(A) (D) and (E) only
(B) (A) and (B) only
(C) (A) and (C) only
(D) (B) and (D) only

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73. Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A) : A person goes to high altitude and experiences "Altitude Sickness" with symptoms like breathing difficulty and heart palpitations.
Reason (R) : Due to low atmospheric pressure at high altitude, the body does not get sufficient oxygen.
In the light of the above statements, choose the correct answer from the options given below :

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

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74. The salient features of genetic code are :

(A) The code is palindromic

(B) UGA act as initiator codon

(C) The code is unambiguous and specific

(D) The code is nearly universal

Choose the most appropriate answer from the options given below :

(A) (A) and (D) only

(B) (B) and (C) only

(C) (A) and (B) only

(D) (C) and (D) only

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75. Arrange the events of Renin - Angiotensin mechanism in correct sequence.

(A) Activation of JG cells and release of renin.

(B) Angiotensin II activates release of aldosterone.

(C) Fall in glomerular blood pressure.

(D) Reabsorption of Na^+ and water from distal convoluted tubule.

(E) Angiotensinogen is converted to Angiotensin I and then to Angiotensin II.

Choose the correct answer from the options given below :

(A) (C), (A), (E), (B), (D)

(B) (A), (D), (E), (C), (B)

(C) (A), (D), (C), (B), (E)

(D) (B), (A), (E), (D), (C)

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76. Given below are two statements :

Statement I : Parathyroid hormone acts on bones and stimulates the process of bone resorption.

Statement II : Parathyroid hormone along with Thyrocalcitonin plays a significant role in carbohydrate metabolism.

In the light of the above statements, choose the correct answer from the options given below :

(A) Statement I is correct but Statement II is false

(B) Statement I is incorrect but Statement II is true

(C) Both Statement I and Statement II are true.

(D) Both Statement I and Statement II are false.

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77. Select the correct statements :

(A) Platyhelminthes are triploblastic pseudocoelomate and bilaterally symmetrical organisms.

(B) Ctenophores reproduce only sexually and fertilization is external.

(C) In tapeworm, fertilization is internal but sexes are not separate.

(D) Ctenophores are exclusively marine, diploblastic and bioluminescent organisms.

(E) In sponges, fertilization is external and development is direct.

Choose the correct answer from the options given below :

(A) (A), (C) and (D) only

(B) (B), (C) and (D) only

(C) (A) and (E) only

(D) (B) and (D) only

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78. Match List-I with List-II.

List - I | List - II

(A) Gene therapy (I) Separation of DNA fragments

(B) RNA interference (II) Diagnostic test for AIDS

(C) ELISA (III) Cellular defence

(D) Gel Electrophoresis (IV) Allows correction of a gene defect.

Choose the correct answer from the options given below :

(A) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)
(B) (A)-(IV), (B)-(II), (C)-(III), (D)-(I)
(C) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)
(D) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)

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79. Which of the following statements are correct with respect to Golgi apparatus ?

(A) It is the important site of formation of glycoprotein and glycolipids.

(B) It produces cellular energy in the form of ATP.

(C) It modifies the protein synthesized by ribosomes on ER.

(D) It facilitates the transport of ions.

(E) It provides mechanical support.

Choose the most appropriate answer from the options given below :

(A) (B) and (C) only
(B) (A) and (C) only
(C) (A) and (D) only
(D) (D) and (E) only

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80. Given below are two statements :

Statement I : In cockroach, the forewings are transparent and prothoracic in origin.

Statement II : In cockroach, the hind wings are opaque, leathery and mesothoracic in origin.

In the light of the above statements, choose the correct answer from the options given below :

(A) Statement I is correct but Statement II is false
(B) Statement I is incorrect but Statement II is true
(C) Both Statement I and Statement II are true
(D) Both Statement I and Statement II are false

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81. Match List-I with List-II.

List - I | List - II

(A) Columnar epithelium (I) Ducts of glands

(B) Ciliated epithelium (II) Inner lining of stomach and intestine

(C) Squamous epithelium (III) Inner lining of bronchioles

(D) Cuboidal epithelium (IV) Endothelium

Choose the correct answer from the options given below :

(A) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)
(B) (A)-(III), (B)-(II), (C)-(IV), (D)-(I)
(C) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)
(D) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)

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82. Match List-I with List-II.

List - I | List - II

(A) Cytokine barriers (I) Mucus coating of respiratory tract

(B) Cellular barriers (II) Interferons

(C) Physiological barriers (III) Neutrophils and Macrophages

(D) Physical barriers (IV) Tears and Saliva

Choose the correct answer from the options given below :

(A) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
(B) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
(C) (A)-(III), (B)-(I), (C)-(II), (D)-(IV)
(D) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)

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83. Select the correct statement/s with respect to mechanism of sex determination in Grasshopper.

(A) It is an example of female heterogamety.

(B) Male produces two different types of gametes either with or without X chromosome.

(C) Total number of chromosomes (autosomes and sex chromosomes) is same in both males and females.

(D) All eggs bear an additional X chromosome besides the autosomes.

Choose the correct answer from the options given below :

(A) (B) and (D) only
(B) (A), (C) and (D) only
(C) (A) only
(D) (A) and (C) only

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84. Nitrates and phosphates flowing from agricultural farms into water bodies are a significant cause of :

(A) Eutrophication
(B) Humification
(C) Mineralisation
(D) Stratification

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85. Identify the correct statements regarding Mass flow hypothesis.

(A) Mass flow is faster than diffusion.

(B) Mass flow is the result of pressure difference between the end points.

(C) Different substances involved in mass flow move at different paces.

(D) Mass flow can result through either a positive or a negative hydrostatic pressure gradient.

Choose the correct answer from the options given below :

(A) (A), (C), (D) only
(B) (B), (C), (D) only
(C) (A), (B), (C) only
(D) (A), (B), (D) only

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86. What will happen if fresh water lake gets contaminated by addition of polluted water with high BOD?

(A) Amount of dissolved oxygen in the lake will decrease
(B) The lake will remain unaffected
(C) Number of submerged aquatic plants in the lake will increase
(D) Number of aquatic animals in the lake will increase

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87. During symport two different molecules move across the membrane :

(A) in same direction with the help of different carriers located at a common site
(B) in same direction with the help of different carriers located at different sites in the same cell
(C) in same direction with the help of same carrier
(D) in opposite direction with the help of same carrier

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88. Which of the following mineral ion is not remobilized in plants?

(A) Potassium
(B) Calcium
(C) Nitrogen
(D) Phosphorus

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89. Match Column I with Column II.

Column - I | Column - II

(A) Nitrococcus (I) Denitrification

(B) Rhizobium (II) Conversion of ammonia to nitrite

(C) Thiobacillus (III) Conversion of nitrite to nitrate

(D) Nitrobacter (IV) Conversion of atmospheric nitrogen to ammonia

(A) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
(B) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)
(C) (A)-(II), (B)-(IV), (C)-(I), (D)-(III)
(D) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)

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90. Given below are two statements :

Statement I : The process of translocation through phloem is unidirectional but through xylem, it is bidirectional.

Statement II : The most readily mobilized elements are phosphorus, sulphur, nitrogen and potassium.

In the light of the above statements, choose the most appropriate answer from the options given below :

(A) Statement I is correct but Statement II is incorrect.
(B) Statement I is incorrect but Statement II is correct.
(C) Both Statement I and Statement II are correct.
(D) Both Statement I and Statement II are incorrect.

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91. Arrange the sequence of different hormones for their role during gametogenesis.

(A) Gonadotropin LH stimulates synthesis and secretion of Androgen

(B) Gonadotropin releasing hormone from hypothalamus

(C) Androgen stimulates spermatogenesis

(D) Gonadotropin FSH helps in the process of spermiogenesis

(E) Gonadotropins from anterior pituitary gland.

Choose the correct answer from the options given below :

(A) (E), (A), (D), (B), (C)
(B) (C), (A), (D), (E), (B)
(C) (B), (E), (A), (C), (D)
(D) (D), (B), (A), (C), (E)

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92. Given below are two statements :

Statement I :- The nose contains mucus – coated receptors which are specialised for receiving the sense of smell and are called olfactory receptors.

Statement II :- Wall of the eye ball has three layers. The external layer is called choroid (dense connective tissue), middle layer is sclera (thin pigmented layer) and internal layer is retina (ganglion cells, bipolar cells and photoreceptor cells).

In the light of the above statements, choose the correct answer from the options given below:

(A) Statement I is true but statement II is false
(B) Statement I is false but Statement II is true
(C) Both Statement I and Statement II are true
(D) Both Statement I and Statement II are false.

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93. Match List-I with List-II.

List - I | List - II

(A) Deforestation (I) Responsible for heating of Earth's surface and atmosphere

(B) Reforestation (II) Conversion of forested areas to non-forested areas

(C) Green-house effect (III) Natural ageing of lake by nutrient enrichment of its water

(D) Eutrophication (IV) Process of restoring a forest that once existed but was removed

Choose the correct answer from the options given below :

(A) A-(IV), B-(III), C-(II), D-(I)
(B) A-(I), B-(II), C-(III), D-(IV)
(C) A-(III), B-(I), C-(II), D-(IV)
(D) A-(II), B-(IV), C-(I), D-(III)

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94. Diacetyl morphine is also called as :

(A) Amphetamine
(B) Barbiturate
(C) Crack
(D) Smack

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95. Select the correct sequential steps regarding absorption of fatty acids and glycerol, in intestine.

(A) Micelles are reformed into small protein coated fat globules called chylomicrons.

(B) Micelles move into intestinal mucosa.

(C) Fatty acids and glycerol are incorporated into small droplets called micelles.

(D) Lacteals release the absorbed substances into blood stream.

(E) Chylomicrons are transported into lacteals.

Choose the correct answer from the options given below :

(A) (A), (E), (B), (D), (C)
(B) (D), (E), (B), (C), (A)
(C) (C), (B), (A), (E), (D)
(D) (B), (C), (E), (A), (D)

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96. Select the correct statements regarding dissolved Oxygen and Biochemical Oxygen Demand.

(A) BOD is inversely related to dissolved oxygen.

(B) Low dissolved oxygen and high BOD lead to loss of aquatic life.

(C) High BOD leads to high dissolved oxygen.

(D) Both BOD and dissolved oxygen are indicator of health of a water body.

(E) Both BOD and dissolved oxygen are affected by amount of organic matter in the water body.

Choose the most appropriate answer from the options given below :

(A) (A), (B), (C), (E) only

(B) (A), (B), (D), (E) only

(C) (A), (B), (C), (D) only

(D) (B), (C), (D), (E) only

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97. Select the incorrect statement with respect to Multiple Ovulation Embryo Transfer (MOET) Technology.

(A) Fertilised eggs at 4 to 6 cells - stages are recovered non-surgically from super-ovulating cow and transferred to surrogate mother.

(B) It is used to increase herd size in a short time

(C) Cow is administered with hormones to induce super-ovulation.

(D) Super-ovulating cow is either mated with elite bull or is artificially inseminated.

Answer key and explanations

1. Answer: (C) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)

Amino acids in a protein are joined by peptide bonds, an unsaturated fatty acid is defined by its C=C double bonds, nucleotides in a nucleic acid are linked by phosphodiester bonds and monosaccharides in a polysaccharide by glycosidic bonds. The trap is pairing nucleic acids with peptide bonds; peptide bonds belong only to proteins.

2. Answer: (D) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)

Hydrarch succession starts in water with phytoplankton and moves to mesic conditions, xerarch starts on bare rock with lichens, ecological succession in general is the gradual change in species composition of an area, and secondary succession is faster because soil is already present. Pairing xerarch with 'faster' is wrong; speed is the feature of secondary succession.

3. Answer: (A) Valvate

In Calotropis the margins of adjacent sepals or petals just touch each other without overlapping, which is valvate aestivation. Twisted aestivation (china rose, cotton) has each margin overlapping the next, and vexillary is the pea-family arrangement.

4. Answer: (A) (A)-(III), (B)-(II), (C)-(IV), (D)-(I)

In chromatography of leaf pigments, chlorophyll a is bright or blue-green, chlorophyll b yellow-green, xanthophylls yellow and carotenoids yellow to yellow-orange. The trap is swapping the two chlorophylls: chlorophyll b, not a, is the yellow-green one.

5. Answer: (A) (A)-(III), (B)-(IV), (C)-(II), (D)-(I)

A monohybrid cross gives a 3:1 phenotypic ratio in F_2, a dihybrid cross 9:3:3:1, incomplete dominance 1:2:1 (phenotype matches genotype) and a test cross of a heterozygote 1:1. The 1:2:1 ratio belongs to incomplete dominance, not to the ordinary monohybrid phenotypic ratio.

6. Answer: (D) Twice

Within the TCA cycle CO_2 is released twice: when isocitrate is converted to α-ketoglutarate and when α-ketoglutarate is converted to succinyl CoA. 'Thrice' is the trap; the third CO_2 per pyruvate is released in the link reaction (pyruvate to acetyl CoA), which is not part of the cycle itself.

7. Answer: (B) Diplotene

The synaptonemal complex forms in zygotene, persists through pachytene while crossing over occurs, and dissolves in diplotene, when homologues begin to separate and chiasmata become visible. Pachytene is the trap: the complex is still present then.

8. Answer: (C) Both Statement I and Statement II are correct

RuBisCO is the most abundant enzyme in the world, so Statement I is correct. In C_4 plants the CO_2 concentration around RuBisCO in bundle sheath cells is kept high, so its oxygenase activity is suppressed and photorespiration does not occur; Statement II is also correct.

9. Answer: (A) species within a genus

In the rivet popper analogy the airplane is the ecosystem and each rivet is a species; removing rivets one by one (species going extinct) eventually threatens the safety of the whole plane. 'Ecosystem' is the trap: the ecosystem is the airplane, not the rivets.

10. Answer: (D) Standard, Wings and Keel

In vexillary aestivation of pea, the large posterior petal is the standard (vexillum), the two lateral petals are wings and the two anterior petals fuse to form the keel. Options putting keel first reverse the positions.

11. Answer: (D) Leguminosae, Solanaceae and Rosaceae

Pollen of many members of Rosaceae, Leguminosae and Solanaceae stays viable for months. Poaceae is the trap: rice and wheat pollen lose viability within about 30 minutes of release.

12. Answer: (A) Geitonogamy

Geitonogamy is transfer of pollen from the anther to the stigma of another flower on the same plant; it is functionally cross-pollination but genetically like selfing. Autogamy is within the same flower and xenogamy is to a flower on a different plant.

13. Answer: (A) Phototropism

Auxin was discovered through the Darwins' studies of phototropism, the bending of canary grass coleoptiles towards unilateral light, later explained by Went's isolation of auxin from coleoptile tips. Apical dominance is also controlled by auxin but played no part in its discovery.

14. Answer: (A) Monocot root

A radial vascular arrangement with exarch xylem, endodermis and pericycle indicates a root, and polyarch xylem (many bundles, usually more than six) indicates a monocot root. Dicot roots have only two to four xylem bundles, and stems have conjoint, endarch bundles.

15. Answer: (B) Chromosome 1

Chromosome 1, the largest human chromosome, was the last to be completely sequenced, in May 2006. Chromosome 22 is the trap: it was the first one finished.

16. Answer: (A) Standing state

The amount of nutrients such as C, N, P and Ca present in the soil at a given time is called the standing state. Standing crop is different: it is the mass of living material at each trophic level at a given time.

17. Answer: (D) Mutualism

Plant–pollinator interaction benefits both partners: the animal gets pollen or nectar and the plant gets pollinated, which is mutualism. Commensalism benefits only one partner while the other is unaffected.

18. Answer: (D) keystone species

A keystone species has an influence on community structure far greater than its numbers suggest and controls the relative abundance of other species. Endemic species are those confined to one region, and alien or exotic species are introduced ones.

19. Answer: (D) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

Adiantum is a fern (Pteropsida), Selaginella belongs to Lycopsida, Psilotum to Psilopsida and Equisetum (horsetail) to Sphenopsida. Pairing Pteropsida with Equisetum is the trap; Equisetum is the type of Sphenopsida.

20. Answer: (A) Fructose

Inulin is a storage polysaccharide made of fructose units, in contrast to starch and glycogen, which are polymers of glucose.

21. Answer: (A) Thermus aquaticus

Taq polymerase, which survives the high denaturation temperature of each PCR cycle, comes from the hot-spring bacterium Thermus aquaticus. E. coli is the usual cloning host, not the source of the heat-stable enzyme.

22. Answer: (C) Repressor protein

The repressor protein, coded by the regulator (i) gene, binds to the operator and physically blocks RNA polymerase from transcribing the structural genes. The regulator gene makes the repressor; the inducer removes it from the operator.

23. Answer: (B) 20 produced violet and 20 produced white flowers

Vv × vv is a test cross: half the progeny are Vv (violet) and half vv (white), so 40 progeny give about 20 violet and 20 white. 30:10 would be the 3:1 result of selfing a heterozygote.

24. Answer: (A) Acetyl CoA

Fats are broken into glycerol and fatty acids; fatty acids are degraded to acetyl CoA, which enters the Krebs cycle. Dihydroxyacetone phosphate is the entry point of glycerol, not of fatty acids.

25. Answer: (D) BamH I

In pBR322 the BamH I (and Sal I) sites lie inside the tetracycline resistance gene, so inserting foreign DNA there inactivates it. Pst I and Pvu I sites lie in the ampicillin resistance gene, and the EcoR I site is in neither resistance gene.

26. Answer: (B) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)

Auxins induce flowering in pineapple, gibberellins increase the length of grape stalks, cytokinins help overcome apical dominance, and ethylene promotes female flowers in cucumber. The trap is pairing auxin with 'overcoming apical dominance'; auxin causes apical dominance.

27. Answer: (B) Phaeophyceae and Rhodophyceae

Brown algae (Phaeophyceae) have fucoxanthin, which gives their colour, and red algae (Rhodophyceae) have r-phycoerythrin. Chlorophyceae have mainly chlorophyll a and b.

28. Answer: (B) Sickle cell anemia

In sickle cell anaemia a single base change (GAG to GUG) in the β-globin gene puts valine in place of glutamic acid at the sixth position. Thalassemia is a quantitative defect in globin synthesis, not this substitution.

29. Answer: (A) cardiac glycosides

Calotropis makes highly poisonous cardiac glycosides, so cattle and goats do not browse on it. Quinine and strychnine are plant alkaloids from other plants, and ricin comes from castor.

30. Answer: (A) (A), (B), (D), (C)

The cambium produces secondary xylem towards the inside and secondary phloem towards the outside, pushing primary xylem towards the pith and primary phloem towards the cortex. So from pith outwards: primary xylem, secondary xylem, secondary phloem, primary phloem. Placing secondary xylem before primary xylem reverses the inner side.

31. Answer: (B) Cyclic photophosphorylation involves both PS I and PS II

Cyclic photophosphorylation involves only PS I, so the statement that it uses both photosystems is incorrect. The others are true: grana lamellae carry both PS I and PS II, non-cyclic flow makes ATP and NADPH + H^+, and stroma lamellae lack PS II and NADP reductase.

32. Answer: (D) (C), (B), (A), (D), (E)

The megaspore mother cell first divides meiotically, three of the four megaspores degenerate, the functional megaspore undergoes three free nuclear divisions, nuclei arrange at the poles, and finally walls form to give the seven-celled, eight-nucleate embryo sac. The free nuclear divisions cannot come before meiosis.

33. Answer: (A) All pteridophytes exhibit haplo-diplontic pattern.

All pteridophytes (and bryophytes) show a haplo-diplontic life cycle with alternating multicellular gametophyte and sporophyte. Seed plants are diplontic, most algae are haplontic, and bryophytes are haplo-diplontic, so the other statements are false.

34. Answer: (A) It is used to deliver gene of interest in both prokaryotic as well as eukaryotic host cells.

Agrobacterium delivers its T-DNA into plant (eukaryotic) cells; it is not used to deliver genes into prokaryotic hosts, so that statement is incorrect. Wild strains do turn plant cells into tumour cells, while the disarmed Ti plasmid used as a vector is non-pathogenic.

35. Answer: (B) (B), (C) and (D) only

Lateral (secondary) meristems are the fascicular vascular cambium, interfascicular cambium and cork cambium, which add girth. Axillary buds and intercalary meristems are derived from the apical meristem and are not lateral meristems.

36. Answer: (C) Both Statement I and Statement II are true

Transcription is the copying of genetic information from one DNA strand into RNA, and a transcription unit is defined by a promoter, the structural gene and a terminator. Both statements are textbook definitions.

37. Answer: (B) A. D Hershey and M.J. Chase

Alfred Hershey and Martha Chase (1952) grew bacteriophages with ^{32}P (labels DNA) and ^{35}S (labels protein) and found only ^{32}P entering bacteria. Avery, MacLeod and McCarty showed DNA to be the transforming principle by enzyme experiments, not with labelled phages.

38. Answer: (D) 6

Seed colour shows complete dominance and gives 2 phenotypes (yellow, green), while flower colour shows incomplete dominance and gives 3 (red, pink, white). With independent assortment the F_2 has $2 \times 3 = 6$ phenotypic classes. Four would be the answer only if both traits showed complete dominance.

39. Answer: (D) Anaphase, Anaphase II

Centromeres split and sister chromatids separate in anaphase of mitosis and in anaphase II of meiosis. In anaphase I homologous chromosomes separate while each still keeps its centromere intact.

40. Answer: (C) Plant growth is generally determinate.

Plant growth is generally indeterminate because meristems keep dividing throughout life, so 'growth is generally determinate' is the incorrect statement. Increased vacuolation during elongation, abundant plasmodesmata in meristematic cells and measurability of growth are all correct.

41. Answer: (D) (A)-(III), (B)-(I), (C)-(II), (D)-(IV)

Cassia has zygomorphic flowers, mustard has hypogynous flowers, plum has perigynous flowers and cucumber has epigynous flowers. Mustard flowers are actinomorphic, so pairing mustard with zygomorphic is wrong.

42. Answer: (B) Syphilis and trichomoniasis

Syphilis (bacterial) and trichomoniasis (protozoan) are completely curable with early treatment. Hepatitis B, genital herpes and HIV infection are viral and not completely curable, and genital warts can recur.

43. Answer: (C) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)

Typhoid is caused by Salmonella typhi, elephantiasis by the filarial worm Wuchereria (Aschelminthes), ringworm by fungi such as Microsporum, and malaria by the protozoan Plasmodium.

44. Answer: (D) Lecithin

Lecithin is a phospholipid of cell membranes and is a primary metabolite. Curcumin, morphine and anthocyanin have no role in normal primary metabolism and are secondary metabolites.

45. Answer: (D) Muscidae

The housefly Musca domestica belongs to the family Muscidae (order Diptera). Hominidae is the human family and Cyprinidae a fish family.

46. Answer: (A) Mature insulin molecule consists of three polypeptide chains-A, B and C.

Mature insulin has only two polypeptide chains, A and B, linked by disulphide bridges; the C-peptide is present in the prohormone (proinsulin) and is removed during maturation. So the statement that mature insulin has three chains is incorrect.

47. Answer: (D) G_0

Cells that exit G_1 and stop dividing enter the quiescent G_0 stage, where they remain metabolically active but do not proliferate. G_1 and G_2 are active growth phases of interphase.

48. Answer: (C) Both Statement I and Statement II are true

RNA is reactive and unstable, so it mutates faster; and RNA can directly code for protein synthesis and so express characters easily, whereas DNA depends on RNA for this. Both statements are true.

49. Answer: (C) Both (A) and (R) are true and (R) is the correct explanation of (A)

The ascending limb of Henle's loop is impermeable to water but transports electrolytes actively or passively, so as filtrate moves up, electrolytes leave into the medullary fluid and the filtrate becomes dilute. The reason describes the dilution that follows from the assertion, and the printed key treats it as the correct explanation.

50. Answer: (B) Uricotelic only

Cockroaches excrete nitrogenous waste mainly as uric acid through Malpighian tubules, so they are uricotelic. Ammonotelism is typical of aquatic animals.

51. Answer: (A) (D), (A), (C), (B), (E)

Respiration proceeds as pulmonary ventilation, diffusion of O_2 and CO_2 across the alveolar membrane, transport of gases by blood, diffusion between blood and tissues, and finally use of O_2 by cells. The other sequences start with a later step.

52. Answer: (A) Over-exploitation, habitat loss and fragmentation.

Habitat loss and fragmentation, over-exploitation, alien species invasions and co-extinctions are all causes of biodiversity loss, so a single cause listed as 'only' is wrong.

53. Answer: (D) (A)-(II), (B)-(I), (C)-(III), (D)-(IV)

Contractile vacuoles occur in Amoeba, the water vascular system in echinoderms such as Asterias, the canal system in sponges such as Spongilla, and flame cells in flatworms such as Taenia.

54. Answer: (D) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)

Palm bones are metacarpals, wrist bones carpals, ankle bones tarsals and digit bones phalanges. The trap is confusing carpals (wrist) with tarsals (ankle).

55. Answer: (C) A-(III), B-(I), C-(IV), D-(II)

Lippes loop is a non-medicated IUD, Multiload 375 a copper-releasing IUD and LNG-20 a hormone-releasing IUD, while vaults are rubber barriers placed over the cervix. Swapping Multiload and LNG-20 is the usual error.

56. Answer: (A) Restriction enzymes

Restriction endonucleases cut DNA at specific sequences and are called molecular scissors. DNA ligase joins fragments and is the molecular glue.

57. Answer: (D) (A) and (C) only

Sickle cell anaemia results from a change in the β-globin gene, a point mutation (GAG to GUG) that puts valine in place of glutamic acid, not lysine. The base change is A to T in DNA (A to U in mRNA), so the statement about U replaced by A is also wrong.

58. Answer: (B) Statement I is incorrect but Statement II is true

ICSI, in which a sperm is injected directly into the ovum in the laboratory, is an in-vitro fertilisation technique, so Statement I is incorrect. Artificial insemination does correct infertility due to the male partner's inability to inseminate, so Statement II is true.

59. Answer: (D) A-(III), B-(I), C-(IV), D-(II)

The P-wave shows atrial depolarisation, the QRS complex ventricular depolarisation, the T-wave ventricular repolarisation, and the end of the T-wave marks the end of systole.

60. Answer: (C) A-(II), B-(III), C-(IV), D-(I)

Of total WBCs, neutrophils are about 60–65%, lymphocytes 20–25%, monocytes 6–8% and eosinophils 2–3%. The trap is giving eosinophils the neutrophil value.

61. Answer: (C) Both Statement I and Statement II are true

Goblet cells of the alimentary canal are unicellular glands, and earwax is produced by ceruminous glands, which are exocrine glands. Both statements are true.

62. Answer: (B) Statement I is incorrect but Statement II is true

A primary follicle surrounded by more layers of granulosa cells and a new theca becomes a secondary follicle; the follicle with a fluid-filled antrum is the tertiary follicle, so Statement I is incorrect. The Graafian follicle ruptures to release the secondary oocyte at ovulation, so Statement II is true.

63. Answer: (B) 9

New snails added = 2500 − 250 = 2250; birth rate per snail per year = 2250 / 250 = 9. Taking 2500/250 = 10 counts the original snails as births.

64. Answer: (B) Lactose

Lactose (through allolactose) inactivates the repressor and switches on the lac operon, so it is the inducer. Glucose does not induce the operon, and galactose is only a product of lactose hydrolysis.

65. Answer: (A) X-Generic name, Y-Specific epithet, Z-Carolus Linnaeus

In binomial nomenclature the first word is the generic name and the second the specific epithet, a system proposed by Carolus Linnaeus. R.H. Whittaker proposed the five-kingdom classification, not binomial naming.

66. Answer: (C) (A), (B) and (D) only

Reproductive health means total well-being in all aspects of reproduction, amniocentesis is legally banned in India for sex determination, and it is used to detect genetic disorders and survivability of the foetus. Saheli was developed at CDRI, Lucknow, not with ICMR, so that statement is wrong.

67. Answer: (D) A-(II), B-(IV), C-(I), D-(III)

Diterpenes are terpenoids, concanavalin A is a lectin, codeine is an alkaloid and ricin is a toxin. The trap is calling ricin a lectin and codeine a toxin.

68. Answer: (C) Both Statement I and Statement II are correct.

Mesosomes are infoldings or extensions of the bacterial plasma membrane, and they help in cell wall formation, DNA replication and its distribution to daughter cells, respiration and secretion. Both statements are correct.

69. Answer: (C) (D), (A), (B), (E), (C)

Prophase I proceeds through leptotene, zygotene, pachytene, diplotene and diakinesis. Sequences that put zygotene first or diakinesis before diplotene are wrong.

70. Answer: (A) Mid-brain, Pons and Medulla Oblongata

The brainstem is formed by the midbrain, pons and medulla oblongata, connecting the brain with the spinal cord. Thalamus and hypothalamus are forebrain parts, and the cerebellum is not part of the brainstem.

71. Answer: (B) Neanderthal man

Neanderthal man had a brain capacity of about 1400 cc, used hides to protect the body and buried the dead. Homo erectus had about 900 cc and Homo habilis about 650–800 cc.

72. Answer: (B) (A) and (B) only

Phages grown with radioactive phosphorus got radioactive DNA (DNA contains phosphorus, protein does not), and phages grown with radioactive sulphur got radioactive protein (protein contains sulphur, DNA does not). The statements reversing these are false.

73. Answer: (C) Both (A) and (R) are true and (R) is the correct explanation of (A).

At high altitude the low atmospheric pressure means the body does not get enough oxygen, which causes altitude sickness with nausea, fatigue and heart palpitations. The reason is therefore true and directly explains the assertion.

74. Answer: (D) (C) and (D) only

The genetic code is unambiguous and specific (one codon, one amino acid) and nearly universal. It is not palindromic, and AUG, not UGA, is the initiator codon; UGA is a stop codon.

75. Answer: (A) (C), (A), (E), (B), (D)

A fall in glomerular blood pressure activates JG cells to release renin, which converts angiotensinogen to angiotensin I and then angiotensin II; angiotensin II stimulates aldosterone release, which increases Na^+ and water reabsorption from the distal tubule. Each other sequence starts at the wrong step.

76. Answer: (A) Statement I is correct but Statement II is false

Parathyroid hormone acts on bones to stimulate bone resorption (demineralisation), raising blood calcium. PTH and thyrocalcitonin together regulate calcium balance, not carbohydrate metabolism, so Statement II is false.

77. Answer: (B) (B), (C) and (D) only

Ctenophores reproduce only sexually with external fertilisation, are exclusively marine, diploblastic and bioluminescent, and tapeworms are hermaphrodite with internal fertilisation. Platyhelminthes are acoelomate, not pseudocoelomate, and sponges have internal fertilisation with indirect development, so those statements are false.

78. Answer: (C) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)

Gene therapy allows correction of a gene defect, RNA interference is a cellular defence mechanism, ELISA is a diagnostic test for AIDS, and gel electrophoresis separates DNA fragments.

79. Answer: (B) (A) and (C) only

The Golgi apparatus modifies proteins made by ribosomes on the ER and is the main site of formation of glycoproteins and glycolipids. ATP production is the role of mitochondria, and mechanical support is given by the cytoskeleton.

80. Answer: (D) Both Statement I and Statement II are false

In cockroach the forewings (tegmina) arise from the mesothorax and are opaque, dark and leathery, while the hind wings arise from the metathorax and are transparent and membranous. Both statements mix up these features, so both are false.

81. Answer: (D) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)

Columnar epithelium lines the stomach and intestine, ciliated epithelium the bronchioles, squamous epithelium forms the endothelium of blood vessels, and cuboidal epithelium lines the ducts of glands.

82. Answer: (A) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)

Interferons are cytokine barriers, neutrophils and macrophages are cellular barriers, tears and saliva (along with stomach acid) are physiological barriers, and the mucus coating of the respiratory tract is a physical barrier.

83. Answer: (A) (B) and (D) only

Grasshoppers show XO sex determination: males have one X fewer than females and produce two kinds of sperm, with or without X, while all eggs carry an X besides the autosomes. This is male heterogamety, and the total chromosome number differs between the sexes.

84. Answer: (A) Eutrophication

Nitrates and phosphates from fertiliser runoff enrich water bodies with nutrients and cause algal blooms and accelerated ageing of the water body, which is eutrophication. Humification and mineralisation are steps of decomposition in soil.

85. Answer: (D) (A), (B), (D) only

Mass flow is faster than diffusion, results from a pressure difference between two points, and can be driven by a positive or negative hydrostatic pressure gradient. In mass flow all substances move together en masse, so they do not move at different paces.

86. Answer: (A) Amount of dissolved oxygen in the lake will decrease

High-BOD water carries much organic matter, which microbes decompose using dissolved oxygen, so the dissolved oxygen of the lake falls. This leads to death of fish and other aquatic animals rather than an increase in them.

87. Answer: (C) in same direction with the help of same carrier

In symport two different molecules cross the membrane in the same direction using the same carrier protein. Movement of two molecules in opposite directions on one carrier is antiport.

88. Answer: (B) Calcium

Calcium is a structural part of the cell wall (calcium pectate) and is not remobilised, so its deficiency first appears in young tissues. Nitrogen, phosphorus and potassium are readily remobilised from older to younger leaves.

89. Answer: (C) (A)-(II), (B)-(IV), (C)-(I), (D)-(III)

Nitrococcus oxidises ammonia to nitrite, Rhizobium fixes atmospheric nitrogen into ammonia, Thiobacillus carries out denitrification, and Nitrobacter oxidises nitrite to nitrate.

90. Answer: (B) Statement I is incorrect but Statement II is correct.

Translocation through phloem is bidirectional (source to sink in either direction), while flow in xylem is unidirectional upwards, so Statement I has them reversed. Phosphorus, sulphur, nitrogen and potassium are indeed the most readily mobilised elements.

91. Answer: (C) (B), (E), (A), (C), (D)

GnRH from the hypothalamus stimulates the anterior pituitary to release gonadotropins; LH stimulates androgen synthesis by Leydig cells, androgens stimulate spermatogenesis, and FSH acts on Sertoli cells to help spermiogenesis. Sequences that begin with androgen or FSH skip the hypothalamic trigger.

92. Answer: (A) Statement I is true but statement II is false

The nose has mucus-coated olfactory receptors specialised for smell, so Statement I is true. In the eyeball the outer layer is the sclera (dense connective tissue) and the middle layer the choroid (pigmented), so Statement II has them reversed.

93. Answer: (D) A-(II), B-(IV), C-(I), D-(III)

Deforestation converts forested areas to non-forested ones, reforestation restores a forest that once existed, the greenhouse effect heats Earth's surface and atmosphere, and eutrophication is the natural ageing of a lake by nutrient enrichment.

94. Answer: (D) Smack

Diacetylmorphine is heroin, commonly called smack, an opioid made by acetylation of morphine. Crack is a form of cocaine, and amphetamines and barbiturates are different drug classes.

95. Answer: (C) (C), (B), (A), (E), (D)

Fatty acids and glycerol are first packed into micelles, which move into the intestinal mucosa, are re-formed into protein-coated chylomicrons, pass into lacteals and finally reach the blood stream.

96. Answer: (B) (A), (B), (D), (E) only

BOD rises as dissolved oxygen falls, low DO with high BOD kills aquatic life, both are indicators of water quality, and both depend on the amount of organic matter. High BOD lowers dissolved oxygen, so that statement is false.

97. Answer: (A) Fertilised eggs at 4 to 6 cells - stages are recovered non-surgically from super-ovulating cow and transferred to surrogate mother.

In MOET the fertilised eggs are recovered non-surgically at the 8–32 cell stage, not 4–6 cells, before transfer to surrogate mothers. Super-ovulation by hormones, mating with an elite bull or artificial insemination, and rapid increase of herd size are all correct.

Questions as set in the AIPMT/NEET papers conducted by CBSE and NTA. Answers checked and explanations written by the RankUp team. RankUp is not affiliated with CBSE or NTA.