WARNING	Any malpractice or any attempt to commit any kind of malpractice in the Examination will DISQUALIFY THE CANDIDATE.

PAPER – II BIOLOGY

Version Code	B3	Question Booklet Serial Number :	
Time : 150 Minutes		Number of Questions : 120	Maximum Marks : 480
Name of Candidate			
Roll Number			
Signature of Candidate			

INSTRUCTIONS TO THE CANDIDATE

1. **Please ensure that the VERSION CODE shown at the top of this Question Booklet is the same as that shown in the OMR Answer Sheet issued to you.** If you have received a Question Booklet with a different Version Code, please get it replaced with a Question Booklet with the same Version Code as that of the OMR Answer Sheet from the Invigilator. **THIS IS VERY IMPORTANT.**
2. Please fill in the items such as Name, Roll Number and Signature in the columns given above. Please also write Question Booklet Sl. No. given at the top of this page against item 4 in the OMR Answer Sheet.
3. This Question Booklet contains 120 questions. For each question, five answers are suggested and given against (A), (B), (C), (D) and (E) of which only one will be the **Most Appropriate Answer**. Mark the bubble containing the letter corresponding to the 'Most Appropriate Answer' in the OMR Answer Sheet, by using either **Blue or Black ball-point pen only.**
4. **Negative Marking**: In order to discourage wild guessing, the score will be subjected to penalization formula based on the number of right answers actually marked and the number of wrong answers marked. Each correct answer will be awarded FOUR marks. ONE mark will be deducted for each incorrect answer. More than one answer marked against a question will be deemed as incorrect answer and will be negatively marked.
5. Please read the instructions given in the OMR Answer Sheet for marking answers. Candidates are advised to strictly follow the instructions contained in the OMR Answer Sheet.

IMMEDIATELY AFTER OPENING THIS QUESTION BOOKLET, THE CANDIDATE SHOULD VERIFY WHETHER THE QUESTION BOOKLET ISSUED CONTAINS ALL THE 120 QUESTIONS IN SERIAL ORDER. IF NOT, REQUEST FOR REPLACEMENT.

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PLEASE ENSURE THAT THIS QUESTION BOOKLET CONTAINS 120 QUESTIONS SERIALLY NUMBERED FROM 1 TO 120.
PRINTED PAGES : 32

1. Match Column I with that of Column II and choose the correct option:

	Column I: Name of the organism		Column II: Chromosome number in gamete (n)
(a)	*Ophioglossum*	(1)	23
(b)	Rice	(2)	24
(c)	Potato	(3)	12
(d)	Man	(4)	630

(A) a–1, b–2, c–3, d–4
(B) a–2, b–3, c–4, d–1
(C) a–3, b–4, c–2, d–1
(D) a–4, b–3, c–2, d–1
(E) a–4, b–3, c–1, d–2

2. Exponential growth in plants can be expressed as:

(A) $L_t = L_0 + rt$
(B) $L_e = L_t rt$
(C) $W_1 = W_0 e^{rt}$
(D) $W_1 = W_0 e rt$
(E) $W_1 = W_0 + e^{rt}$

3. Match List I with List II and choose the correct option:

	List I	List II
a.	Gemmules	1. *Agave*
b.	Leaf-buds	2. *Penicillium*
c.	Bulbil	3. Water hyacinth
d.	Offset	4. Sponges
e.	Conidia	5. *Bryophyllum*

(A) a–4, b–5, c–1, d–3, e–2
(B) a–4, b–3, c–2, d–1, e–5
(C) a–3, b–5, c–4, d–2, e–1
(D) a–4, b–1, c–5, d–3, e–2
(E) a–3, b–5, c–4, d–1, e–2

4. Study the following statements and choose the correct option:

a. Tapetum nourishes the developing pollen grains.
b. Hilum represents the junction between ovule and funicle.
c. In aquatic plants such as water hyacinth and water lily, pollination is by water.
d. The primary endosperm nucleus is triploid.

(A) a and b are correct but c and d are wrong.
(B) a, b and d are correct but c is wrong.
(C) b, c and d are correct but a is wrong.
(D) a and d are correct but b and c are wrong.
(E) b and d are correct but a and c are wrong.

5. Which one of the following pairs is **not** correctly matched?

(A)	Adenine derivative	–	Kinetin
(B)	Carotenoid derivative	–	ABA
(C)	Terpenes	–	IAA
(D)	Indole compounds	–	IBA
(E)	Gas	–	Ethylene

6. Match Column I with Column II and choose the right option:

	I		II
a.	Bears	1.	Diapause
b.	Snail	2.	Hibernation
c.	Zooplanktons	3.	Dormancy
d.	Seeds	4.	Aestivation

(A) a–3, b–4, c–1, d–2
(B) a–2, b–1, c–4, d–3
(C) a–4, b–1, c–2, d–3
(D) a–1, b–4, c–2, d–1
(E) a–2, b–4, c–1, d–3

7. – 1° C to 13° C annual variations in the intensity and duration of temperature and 50 to 250 cm. annual variation in precipitation, account for the formation of a major biome as:

(A) Temperate forest
(B) Coniferous forest
(C) Tropical forest
(D) Grassland
(E) Desert

8. Match the following and choose the correct combination from the options given:

	Column I: Population Interaction		Column II: Examples
(a)	Mutualism	(1)	Ticks on dogs
(b)	Commensalism	(2)	*Balanus* and *Chathamalus*
(c)	Parasitism	(3)	Sparrow and any seed
(d)	Competition	(4)	Epiphyte on a mango branch
(e)	Predation	(5)	Orchid *Ophrys* and bee

(A) a – 1, b – 5, c – 4, d – 3, e – 2

(B) a – 2, b – 1, c – 5, d – 4, e – 3

(C) a – 3, b – 2, c – 1, d – 5, e – 4

(D) a – 4, b – 3, c – 2, d – 1, e – 5

(E) a – 5, b – 4, c – 1, d – 2, e – 3

9. Which of the following statements regarding food chain is **false**?

(A) In an aquatic ecosystem, grazing food chain is the major conduit for energy flow.

(B) In terrestrial ecosystems, a large fraction of energy flows through detritus food chain.

(C) The detritus food chain begins with dead organic matter.

(D) Primary consumers belong to the first trophic level.

(E) Animals like cockroaches and crows are omnivores.

10. Select the matched ones:

a.	Sedimentary nutrient cycle	Nitrogen cycle
b.	Pioneer species	Lichens
c.	Secondary succession	Burned forests
d.	Pyramid of biomass in sea	Upright

(A) a, b and d only

(B) a and c only

(C) b and c only

(D) b and d only

(E) a, b and c only

11. Select the **wrong** statement:

(A) An overwhelming majority of animals and nearly all plants maintain a constant internal temperature.

(B) An orchid growing as an epiphyte on a mango branch is an example of commensalism.

(C) In brood parasitism, the parasitic bird lays its eggs in the nest of its host and lets the host to incubate them.

(D) Very small animals are rarely found in polar regions.

(E) In amensalism, one species is harmed whereas the other is unaffected.

12. In a grazing food chain carnivores may also be referred to as:

(A) Primary producers

(B) Secondary producers

(C) Primary consumers

(D) Secondary consumers

(E) Decomposers

13. Match List I with List II and choose correct option:

	List I		List II
a.	Pacific salmon fish	1.	Verhulst-Pearl Logistic growth.
b.	$N_t = N_0 e^{rt}$	2.	Breeds only once in lifetime.
c.	Oyster	3.	Exponential growth.
d.	$dN/dt = rN\left(\frac{K-N}{K}\right)$	4.	A large number of small sized offsprings.

(A) a–4, b–3, c–1, d–2

(B) a–3, b–4, c–1, d–2

(C) a–3, b–1, c–4, d–2

(D) a–2, b–3, c–4, d–1

(E) a–2, b–4, c–3, d–1

14. Match the items of Column I with Column II and choose the correct answer:

	I		II
a.	Electrostatic precipitator	1.	removes gases like SO_2
b.	Scrubber	2.	reduces automobile emission
c.	Catalytic converter	3.	removes particulate matter

(A) a–2, b–3, c–1

(B) a–3, b–2, c–1

(C) a–1, b–2, c–3

(D) a–3, b–1, c–2

(E) a–1, b–3, c–2

15. Calcium metabolism in birds gets disturbed due to the effect of :

(A) Mercury
(B) Cadmium
(C) DDT
(D) Lead
(E) Copper

16. Gene amplification using primers can be done by:

(A) Microinjection
(B) ELISA
(C) Polymerase chain reaction
(D) Gene gun
(E) Gel electrophoresis

17. Which of the following is correctly matched?

(A)	*Agrobacterium tumifaciens*	Tumour
(B)	*Thermus aquaticus*	Bt-gene
(C)	pBR322	Enzyme
(D)	Ligase	Molecular scissors
(E)	Hind II	Plasmid vector

18. The protein α-1-antitrypsin is used to treat the disease:

(A) Cancer
(B) Rheumatoid arthritis
(C) Alzheimer's disease
(D) Emphysema
(E) ADA deficiency disease in children

19. Match the following and choose the correct combination from the options given:

	Column I: Kingdom		Column II: Class
(a)	Plantae	(1)	Archaebacteria
(b)	Fungi	(2)	Euglenoids
(c)	Protista	(3)	Phycomycetes
(d)	Monera	(4)	Algae

(A) a – 4, b – 3, c – 2, d – 1
(B) a – 1, b – 2, c – 3, d – 4
(C) a – 3, b – 4, c – 2, d – 1
(D) a – 4, b – 2, c – 3, d – 1
(E) a – 2, b – 3, c – 4, d – 1

20. Select the **wrong** statements:

a. Lower the taxon, more are the charateristics that the members within the taxon share.
b. Order is the assemblage of genera which exhibit a few similar characters.
c. Cat and dog are included in the same family Felidae.
d. Binomial nomenclature was introduced by Carolus Linnaeus.

(A) a, b and c only
(B) b, c and d only
(C) a and d only
(D) c and d only
(E) b and c only

21. Which of the following is an unicellular sac-fungus?

(A) *Claviceps*
(B) *Saccharomyces*
(C) *Penicillium*
(D) *Neurospora*
(E) *Aspergillus*

22. Which of the following is **not** matched correctly?

(A)	*Anabaena*	Cyanobacteria
(B)	*Amoeba*	Protozoa
(C)	*Gonyaulax*	Dinoflagellates
(D)	Thermacidophiles	Archaebacteria
(E)	*Albugo*	Chrysophytes

23. Which one of the following is a characteristic feature of Chrysophytes?

(A) They are parasitic forms which cause diseases in animals
(B) They have a protein rich layer called pellicle
(C) They have indestructible wall layer deposited with silica
(D) They are commonly called Dinoflagellates
(E) They are saprophytic Protista

24. Which of the following **does not** belong to the kingdom Protista?

(A) Chrysophytes (B) Euglenoids
(C) Ascomycetes (D) Dinoflagellates
(E) Protozoans

25. Find out the correct statement:

(A) In lichens, the algal component is called phycobiont and fungal component is known as mycobiont, which are heterotrophic and autotrophic respectively.
(B) Viroid contains RNA of low molecular weight and protein coat.
(C) A virus contains both RNA and DNA.
(D) Viruses are obligatory parasites.
(E) Viruses that infect plants have double stranded RNA.

26. Match Column I with Column II and choose the right option:

	I		II
a.	Morels	1.	Deuteromycetes
b.	Smut	2.	Ascomycetes
c.	Bread mold	3.	Basidiomycetes
d.	Imperfect fungi	4.	Phycomycetes

(A) a–3, b–4, c–1, d–2
(B) a–2, b–3, c–4, d–1
(C) a–4, b–1, c–2, d–3
(D) a–3, b–4, c–2, d–1
(E) a–2, b–1, c–4, d–3

27. Select the correctly matched ones:

a. Phaeophyceae — Mannitol
b. Rhodophyceae — Dictyota
c. Chlorophyceae — Non-motile gametes
d. Rhodophyceae — r-Phycoerythrin

(A) a, b and c only (B) b, c and d only
(C) a and c only (D) c and d only
(E) a and d only

28. Which of the following Pteridophytes belong to class Pteropsida?

(A) *Equisetum* and *Psilotum*
(B) *Lycopodium* and *Adiantum*
(C) *Selaginella* and *Pteris*
(D) *Pteris* and *Adiantum*
(E) *Dryopteris* and *Psilotum*

29. Study the following statements and choose the correct option:

a. Buds are present in the axil of leaflets of the compound leaf.
b. Pulvinus leaf-base is present in some leguminous plants.
c. In Alstonia, the petioles expand, become green and synthesise food.
d. Opposite phyllotaxy is seen in guava.

(A) b and d are correct but a and c are wrong.
(B) a and c are correct but b and d are wrong.
(C) a and d are correct but b and c are wrong.
(D) b, c and d are correct but a is wrong.
(E) a and b are correct but c and d are wrong.

30. Select the correctly matched pair:

(A)	*Colchicum autumnale*	Solanaceae
(B)	*Petunia*	Solanaceae
(C)	*Gloriosa*	Fabaceae
(D)	*Trifolium*	Liliaceae
(E)	*Sesbania*	Solanaceae

31. Match the following and choose the correct combination from the options given:

	Column I: Placentation Types		Column II: Represented in
(a)	Basal	(1)	*Dianthus*
(b)	Free central	(2)	Pea
(c)	Parietal	(3)	Lemon
(d)	Axile	(4)	Marigold
(e)	Marginal	(5)	*Argemone*

(A) a – 1, b – 2, c – 3, d – 4, e – 5
(B) a – 2, b – 3, c – 4, d – 5, e – 1
(C) a – 4, b – 1, c – 5, d – 3, e – 2
(D) a – 4, b – 3, c – 5, d – 1, e – 2
(E) a – 5, b – 4, c – 3, d – 2, e – 1

32. The plant having monadelphous stamens and axile placentation is:

(A) Lemon
(B) Pea
(C) Tomato
(D) Cucumber
(E) China rose

33. Which of the following plants have long slender and coiled stem tendrils developed from axillary buds?

(A) Grapevine and pumpkins
(B) Australian acacia and watermelon
(C) *Bougainvillea* and cucumber
(D) Strawberry and grapevine
(E) *Alstonia* and pumpkins

34. Select the correct statements:

a. From the region of elongation, some of the epidermal cells form root hairs.
b. Pneumatophores are seen in *Rhizophora*.
c. Adventitious roots are seen in the banyan tree.
d. Maize and sugarcane have prop roots.

(A) a and d only
(B) a, c and d only
(C) c and d only
(D) b and c only
(E) a, b and d only

35. Match the following columns:

	Column I: Stem Modifications		Column II: Found in
(a)	Underground stem	(1)	*Euphorbia*
(b)	Stem tendril	(2)	*Opuntia*
(c)	Stem thorns	(3)	Potato
(d)	Flattened stem	(4)	*Citrus*
(e)	Fleshy cylindrical stem	(5)	Cucumber

(A) a - 1, b - 2, c - 3, d - 5, e - 4
(B) a - 2, b - 3, c - 4, d - 5, e - 1
(C) a - 3, b - 4, c - 5, d - 1, e - 2
(D) a - 3, b - 5, c - 4, d - 2, e - 1
(E) a - 5, b - 3, c - 4, d - 1, e - 2

36. The following diagrams represent the types of aestivation in corolla. Identify the correct combination of labelling:

(a) (b) (c) (d)

(A)	a – Valvate,	b – Twisted,	c – Vexillary,	d – Imbricate.
(B)	a – Valvate,	b – Vexillary,	c – Twisted,	d – Imbricate.
(C)	a – Vexillary,	b – Imbricate,	c – Twisted,	d – Valvate.
(D)	a – Valvate,	b – Imbricate,	c – Twisted,	d – Vexillary.
(E)	a – Valvate,	b – Twisted,	c – Imbricate,	d – Vexillary.

37. In dicotyledonous roots, the initiation of lateral roots takes place in:

(A) Endodermal cells
(B) Cortical cells
(C) Epidermal cells
(D) Procambial cells
(E) Pericycle cells

38. In grasses, certain adaxial epidermal cells along the veins modify themselves into large empty, colourless cells called:

(A) Bulliform cells
(B) Companion cells
(C) Guard cells
(D) Subsidiary cells
(E) Albuminous cells

39. Which of the following plants has the floral characters like zygomorphic flower, vexillary aestivation, diadelphous androecium and marginal placentation?

(A) *Pisum*
(B) Belladonna
(C) Brinjal
(D) *Asparagus*
(E) *Aloe*

40. From the options given below, find out the correct floral formula for a flower having the following characters namely actinomorphic, bisexual, five united sepals, five united petals, stamens five and epipetalous, bicarpellary, syncarpous with superior ovary:

(A) ⊕ ♂♀ K (5) C(5) A5 $\underline{G}$ (2)

(B) ⊕ ♂♀ K (5) $\overline{C(5)\ A5}$ $\underline{G}$ (2)

(C) ⊕ ♂♀ K (5) C(5) A(5) $\underline{G}$ (2)

(D) ⊕ ♂♀ K (5) $\overline{C(5)\ A(5)}$ $\overline{G}$ (2)

(E) ⊕ ♂♀ K (5) C(5) A5 $\overline{G}$ (2)

41. Which of the following cells are round and biconcave in shape?

(A) White blood cells
(B) Red blood cells
(C) Columnar epithelial cells
(D) Nerve cells
(E) Mesophyll cells

42. In a polysaccharide, the individual monosaccharides are linked by a:

(A) Glycosidic bond
(B) Peptide bond
(C) Ester bond
(D) Phosphodiester bond
(E) Hydrogen bond

43. Select the matched ones:

a.	S phase	DNA replication
b.	Zygotene	Synapsis
c.	Diplotene	Crossing over
d.	Meiosis	Both haploid and diploid cells
e.	Gap 2 phase	Quiescent stage

(A) a and b only
(B) c and d only
(C) c and e only
(D) a, c and e only
(E) a and d only

44. Choose the type of enzyme involved in the following reaction:

$$S - G + S' \longrightarrow S + S' - G$$

(A) Dehydrogenase
(B) Transferase
(C) Hydrolase
(D) Lyase
(E) Isomerase

45. Consider the following statements and choose the correct option:

(a) The endomembrane system includes plasma membrane, ER, golgi complex, lysosomes and vacuoles.
(b) ER helps in the transport of substances, synthesis of proteins, lipoproteins and glycogen.
(c) Ribosomes are involved in protein synthesis.
(d) Mitochondria help in oxidative phosphorylation and generation of ATP.

(A) b, c and d are correct
(B) a – alone is correct
(C) b – alone is correct
(D) c – alone is correct
(E) d – alone is correct

46. Which of the following enzymes has/have heme as a prosthetic group?

(i) Catalase
(ii) Carboxypeptidase
(iii) Succinic dehydrogenase
(iv) Peroxidase

(A) i only
(B) i and ii only
(C) ii and iii only
(D) iii and iv only
(E) i and iv only

47. Pick out the **wrong** statement:

(A) Amino acids are substituted methanes.
(B) Glycerol is a trihydroxy propane.
(C) Lysine is a neutral amino acid.
(D) Lecithin is a phospholipid.
(E) Adenosine is a nucleoside.

48. Select the **wrong** statement:

(A) Proteins are heteropolymers made of amino acids.

(B) Ribozymes are nucleic acids with catalytic power.

(C) Nucleic acids serve as genetic material.

(D) Proteins, nucleic acids and polysaccharides are the only three types of macromolecules found in the living system.

(E) Collagen is the most abundant protein in the whole of the biosphere and RuBisCO is the most abundant proteins in animal world.

49. The stage between two meiotic divisions is called:

(A) Interphase

(B) Cytokinesis

(C) Interkinesis

(D) Karyokinesis

(E) Diakinesis

50. Which of the following minerals activate the enzymes involved in respiration?

(A) Nitrogen and phosphorus

(B) Magnesium and manganese

(C) Potassium and calcium

(D) Sulphur and iron

(E) Copper and boron

51. Select the correct statement:

(A) Absorption of water by seeds and dry wood are examples of facilitated diffusion.

(B) The apoplast is the system of interconnected protoplasts.

(C) Pinus seeds cannot germinate and establish without the presence of mycorrhizae.

(D) The translocation in phloem is unidirectional whereas in the xylem it is bidirectional.

(E) In plants, the water loss in its liquid phase is known as transpiration.

52. Select the **wrong** statement:

(A) When tripalmitin is used as a substrate in respiration, the R.Q. is 0.7.
(B) The intermediate compound which links glycolysis with Kreb's cycle is malic acid.
(C) One glucose molecule yields a net gain of 36 ATP molecules during aerobic respiration.
(D) One glucose molecule yields a net gain of 2 ATP molecules during fermentation.
(E) The scheme of glycolysis was given by Embden, Meyerhof and Parnas.

53. The process by which water is absorbed by solids like colloids causing them to increase in volume is called:

(A) Osmosis
(B) Plasmolysis
(C) Imbibition
(D) Diffusion
(E) Facilitated diffusion

54. Which of the following statements is true with regard to the light reaction of photosynthesis?

(A) In PSII the reaction centre chlorophyll a has an absorption peak at 700 nm, hence is called P 700.
(B) In PSI the reaction centre chlorophyll a has an absorption maxima at 680 nm and is called P 680.
(C) The splitting of water molecule is associated with PSI.
(D) Photosystems I and II are involved in Z scheme.
(E) Lamellae of the grana have PSI and PS II and stroma lamellae membranes have PS II only.

55. Select the matched ones:

a.	Nitrosomonas	Nitrite to nitrate
b.	Thiobacillus	Denitrification
c.	Nostoc	Free-living nitrogen-fixer
d.	Azotobacter	Anaerobic nitrogen-fixer

(A) a and b only
(B) c and d only
(C) b and c only
(D) b and d only
(E) a and c only

56. Select the **wrongly** matched pair with regard to C_4 cycle:

(A)	Primary CO_2 fixation product	PGA
(B)	Site of initial carboxylation	Mesophyll cells
(C)	Primary CO_2 acceptor	PEP
(D)	C_4 plant	Maize
(E)	Location of enzyme RuBisCO	Bundle sheath cells

57. In C_3 cycle for the fixation of every CO_2 molecule, the reduction and regeneration steps require:

(A) 3 ATP and 2 $NADPH_2$
(B) 2 ATP and 2 $NADPH_2$
(C) 2 ATP and 3 $NADPH_2$
(D) 3 ATP and 3 $NADPH_2$
(E) 3 ATP and 1 $NADPH_2$

58. Which of the following is formed during photorespiration?

(A) Sugar
(B) Phosphoglycolate
(C) NADPH
(D) ATP
(E) Oxaloacetate

59. Which of these steps in Kreb's cycle indicates substrate level phosphorylation?

(A) Conversion of succinic acid to a-ketoglutaric acid.
(B) Conversion of succinic acid to malic acid.
(C) Conversion of succinyl CoA to succinic acid.
(D) Conversion of malic acid to oxalo acetic acid.
(E) Conversion of citric acid to α-ketoglutaric acid.

60. In the electron transport system present in the inner mitochondrial membrane, complexes I and IV are respectively:

(A) NADH dehydrogenase and $FADH_2$
(B) $FADH_2$ and NADH dehydrogenase
(C) NADH dehydrogenase and cytochrome c oxidase complex
(D) NADH dehydrogenase and ATP synthase
(E) Cytochrome bc1 complex and NADH dehydrogenase

61. In Hershey and Chase experiments, radioactive ^{32}P was used to culture bacteriophages which resulted in radioactive:

(A) Viral DNA
(B) Bacterial capsule
(C) Viral proteins
(D) Plasma membrane of bacteria
(E) Protein capsule of bacteriophage

62. XO type of sex determination is seen in:

(A) Man
(B) Grasshopper
(C) *Drosophila*
(D) Birds
(E) Horses

63. Match the enzyme in Column I with its function in Column II and choose the correct option:

Column I		Column II	
i.	β-galactosidase	a.	joining of DNA fragments
ii.	Permease	b.	peptide bond formation
iii.	Ligase	c.	hydrolysis of lactose
iv.	Ribozyme	d.	increases permeability to β-galactosidase

(A) i–b, ii–a, iii–d, iv–c
(B) i–c, ii–d, iii–a, iv–b
(C) i–b, ii–d, iii–a, iv–c
(D) i–a, ii–b, iii–d, iv–c
(E) i–c, ii–a, iii–d, iv–b

64. The loss of a chromosomal segment is due to:

(A) polyploidy
(B) deletions
(C) duplications
(D) inversions
(E) transversion

65. The inducer for switching 'on' the *lac* operon in bacteria is:

(A) presence of lactose
(B) number of bacteria
(C) presence of structural genes in the bacteria
(D) presence of sucrose
(E) presence of RNA polymerase

66. Choose the correct option:

1. Six codons do not code for any amino acid
2. Codon is read in mRNA in a contiguous fashion
3. Three codons function as stop codons
4. The initiator codon AUG codes for methionine

(A) 1, 2 and 4 are wrong
(B) 1, 2 and 3 are wrong
(C) 2, 3 and 4 are wrong
(D) 2 alone is wrong
(E) 1 alone is wrong

67. In Mendelian dihybrid cross when heterozygous Round Yellow are self crossed, Round Green offsprings are represented by the genotype:

(A) RrYy,RrYY,RRYy
(B) Rryy,RRyy,rryy
(C) rrYy,rrYY
(D) Rryy,RRyy
(E) RrYy,rryy,Rryy

68. The haploid content of human DNA is:

(A) 3.3×10^6 bp
(B) 3.3×10^9 bp
(C) 4.6×10^6 bp
(D) 6.6×10^9 bp
(E) 48502 bp

69. Alec Jeffreys developed the DNA finger printing technique. The probe he used was:

(A) Ribozyme
(B) Sex chromosomes
(C) SNP
(D) VNTR
(E) rDNA

70. Automated DNA sequencers, work on the principle of the method developed by:

(A) Erwin Chargaff
(B) Maurice Wilkins
(C) Frederick Sanger
(D) Francis Crick
(E) Alec Jeffreys

71. Allelic sequence variations where more than one variant (allele) at a locus in a human population with a frequency greater than 0.01 is referred to as:

(A) incomplete dominance
(B) multiple allelism
(C) SNP
(D) EST
(E) DNA polymorphism

72. The mucosal layer in the stomach form irregular folds known as:

(A) villi
(B) lumen
(C) rugae
(D) crypts of Lieberkuhn
(E) lacteals

73. The back flow of faecal matter in the large intestine is prevented by the presence of:

(A) epiglottis
(B) sphincter of Oddi
(C) ileo-caecal valve
(D) gastro-oesophagal sphincter
(E) pyloric sphincter

74. Pneumotaxic centre which can moderate the functions of the respiratory rhythm centre is present at:

(A) Pons region of brain
(B) Thalamus
(C) Spinal cord
(D) Right cerebral hemisphere
(E) Left cerebral hemisphere

75. The factor which does not affect the rate of alveolar diffusion is:

(A) Solubility of gases
(B) Thickness of the membranes
(C) Pressure gradient
(D) Concentration gradient
(E) Reactivity of the gases

76. Histamine, serotonin and heparin are secreted by:

(A) Lymphocytes
(B) Monocytes
(C) Neutrophils
(D) Eosinophils
(E) Basophils

77. Congestion of the lungs is one of the main symptoms in:

(A) Hypotension
(B) Coronary artery disease
(C) Angina
(D) Heart failure
(E) Atherosclerosis

78. Choose the correct statement:

(A) the juxta medullary nephrons have reduced Henle's loop
(B) *vasa recta* is well developed in cortical nephrons
(C) the PCT and DCT are situated in the medulla of the kidney
(D) the glomerulus encloses the Bowman's capsule
(E) the ascending limb of the Henle's loop extends as the DCT

79. The condition where urea accumulates in blood is:

(A) Glycosuria
(B) Uremia
(C) Ketonuria
(D) Acidosis
(E) Anaemia

80. Statements about the mechanism of muscle contraction:

I. Acetylcholine is released when the neural signal reaches the motor end plate
II. Muscle contraction is initiated by a signal sent by CNS via a sensory neuron
III. During muscle contraction, isotropic band gets elongated
IV. Repeated activation of the muscles can lead to lactic acid accumulation

(A) I and IV alone are correct
(B) I and III alone are correct
(C) II and III alone are correct
(D) I, II and III alone are correct
(E) I and II alone are correct

81. Actin binding sites are located on:

(A) Troponin
(B) Tropomyosin
(C) Meromyosin
(D) Both tropomyosin and meromyosin
(E) Both troponin and tropomyosin

82. Scapula is a large triangular flat bone situated in the dorsal part of the thorax between:

(A) the second and fifth ribs
(B) the second and seventh ribs
(C) the third and sixth ribs
(D) the third and eighth ribs
(E) the fourth and seventh ribs

83. The electrical potential difference between outside and inside of a nerve axon before excitation is known as:

(A) Resting potential
(B) Action potential
(C) Spike potential
(D) Reaction potential
(E) Activation potential

84. Statements:

1. Synaptic cleft of neurons secrete adrenaline
2. Myelinated nerve fibres are enveloped with Schwann cells, which form a myelin sheath around the axon
3. Non-myelinated nerve fibre is enclosed by a Schwann cell that does not form a myelin sheath
4. Spinal cord and cranial nerves are made of non-myelinated nerve fibres

Of the four statements,

(A) 1, 2 are correct but 3 and 4 are wrong
(B) 1, 2 and 3 are correct but 4 is wrong
(C) 3 and 4 are correct but 1 and 2 are wrong
(D) 1 and 4 are correct while 2 and 3 are wrong
(E) 2 and 3 are correct while 1 and 4 are wrong

85. The order of the three layers of cells in the retina of human eye from inside to outside is:

(A) Bipolar cells, photoreceptor cells, ganglion cells
(B) Ganglion cells, rods, cones
(C) Ganglion cells, bipolar cells, photoreceptor cells
(D) Photoreceptor cells, ganglion cells, bipolar cells
(E) Ganglion cells, photoreceptor cells, bipolar cells

86. Find the correctly matched pair:

(A) Pineal gland - doesn't influence menstrual cycle
(B) Corpus luteum - secretes oxytocin
(C) Interstitial cells - erythropoietic
(D) Cholecystokinin - stimulates pancreatic enzyme secretions
(E) Thyroxine - triiodothyronine

87. Match Column I with Column II and find the correct option:

	Column I		Column II
a.	ANF	1.	regulates blood calcium levels
b.	MSH	2.	decreases blood pressure
c.	GIP	3.	pigmentation
d.	TCT	4.	inhibits gastric secretion

(A) a – 4, b – 1, c – 2, d – 3
(B) a – 2, b – 1, c – 4, d – 3
(C) a – 4, b – 1, c – 3, d – 2
(D) a – 3, b – 2, c – 4, d – 1
(E) a – 2, b – 3, c – 4, d – 1

88. The 'amino acid derivative' among the following hormone is:

(A) Insulin
(B) Epinephrine
(C) Estradiol
(D) Testosterone
(E) Glucagon

89. The volume of blood each ventricle pumps out during a cardiac cycle is about:

(A) 70 ml
(B) 5000 ml
(C) 7 L
(D) 1200 ml
(E) 40 ml

90. The coxal of the pelvic girdle is formed by the fusion of:

(A) ilium, ischium and pubis
(B) scapula and clavicle
(C) ilium and scapula
(D) ilium, scapula and ischium
(E) clavicle and pubis

91. The tract of nerve fibres which connects the cerebral hemispheres is:

(A) corpus luteum
(B) corpus callosum
(C) corpora quadrigeminia
(D) cerebral aqueduct
(E) foramen magnum

92. Saheli is:

(A) a oral contraceptive for females
(B) a surgical sterilization method for females
(C) a diaphragm for females
(D) a diaphragm used by males
(E) a surgical method of sterilization in males

93. The main function of the fimbriae of the fallopian tube in females is to:

(A) release the ovum from the Graafian follicle

(B) make necessary changes in the endometrium for implantation

(C) help in the development of corpus luteum

(D) help in the collection of the ovum after ovulation

(E) help in the development of ovary

94. The chromosomal number in the meiocytes of housefly is:

(A) 8

(B) 12

(C) 21

(D) 23

(E) 34

95. Which is referred to as 'Lungs of the Planet Earth'?

(A) Western Ghats

(B) Lake Victoria

(C) Green Land

(D) Amazon rain forest

(E) Himalayas

96. Choose the **wrong** statement:

(A) Species diversity increases as we move away from the equator towards the poles.

(B) Stellar's sea cow and passenger pigeon got extinct due to over exploitation by man.

(C) *Lantana* and *Eichornia* are invasive weed species in India.

(D) The historic Convention on Biological Diversity was held in 1992.

(E) Among animals, insects are the most species-rich taxonomic group.

97. Match the causative organisms with their diseases:

(i)	*Haemophilus influenza*	(a)	Malignant malaria
(ii)	*Entamoeba histolytica*	(b)	Elephantiasis
(iii)	*Plasmodium falciparum*	(c)	Pneumonia
(iv)	*Wuchereria bancrofti*	(d)	Typhoid
(v)	*Salmonella typhi*	(e)	Amoebiasis

(A) i – a ii – e iii – c iv – b v – d
(B) i – c ii – e iii – a iv – b v – d
(C) i – e ii – a iii – c iv – d v – b
(D) i – a ii – c iii – b iv – e v – d
(E) i – a ii – c iii – e iv – b v – d

98. Cyclosporin A, which is used as an immunosuppressive agent, is produced by:

(A) *Aspergillus*
(B) *Clostridium*
(C) *Saccharomyces*
(D) *Monascus*
(E) *Trichoderma*

99. Flemming, Chain, and Florey were awarded the Nobel Prize in 1945 for the discovery of:

(A) HIV
(B) CT scan
(C) Penicillin
(D) Staphylococcus
(E) Antibodies

100. Which among these is produced by distillation of fermented broth?

(i) Whisky
(ii) Wine
(iii) Beer
(iv) Rum
(v) Brandy

(A) (ii) and (iii) alone
(B) (i) and (ii) alone
(C) (iii) and (v) alone
(D) (i), (iv) and (v) alone
(E) (iii) and (iv) alone

101. Which one among the following is an example for homology?

(A) Eye of octopus and mammals
(B) Tuber of sweet potato and potato
(C) Wings of butterfly and birds
(D) Flippers of penguins and dolphins
(E) Thorn and tendrils of *Bougainvillea* and *Cucurbita*

102. The brain capacity of *Homo erectus* was about:

(A) 650 cc
(B) 900 cc
(C) 1200 cc
(D) 1400 cc
(E) 1600 cc

103. Who proposed that the first form of life could have come from pre-existing non-living organic molecules?

(A) S L Miller
(B) Oparin and Haldane
(C) Charles Darwin
(D) Alfred Wallace
(E) Hugo de Vries

104. Proboscis gland in *Balanoglossus* is associated with:

(A) Digestion
(B) Respiration
(C) Circulation
(D) Excretion
(E) Reproduction

105. Which of these statements are **wrong**?

(i) Parapodia are lateral appendages in arthropods used for swimming
(ii) Radula in molluscs are structures involved in excretion
(iii) Aschelminthes are dioecious
(iv) Echinoderm adults show radial symmetry
(v) Ctenophorans are diploblastic
(A) i and ii
(B) i and iii
(C) i, iv and v
(D) iii and v
(E) ii, iii and iv

106. Which one of the following does not have an excretory system?

(A) *Myxine*

(B) *Carcharodon*

(C) *Balanoglossus*

(D) *Asterias*

(E) *Catla*

107. Match the following and choose the correct option:

(i)	Cyclostomes	a.	Hemichordata
(ii)	Aves	b.	Urochordata
(iii)	Tunicates	c.	Agnatha
(iv)	*Balanoglossus*	d.	Pisces
(v)	Osteichthyes	e.	Tetrapod

(A)	i – a	ii – b	iii – c	iv – d	v – e
(B)	i – b	ii – c	iii – d	iv – a	v – e
(C)	i – c	ii – e	iii – b	iv – a	v – d
(D)	i – c	ii – a	iii – e	iv – b	v – d
(E)	i – e	ii – c	iii – b	iv – a	v – d

108. In earthworms setae are present in all segments except the:

(A) first and the last segments

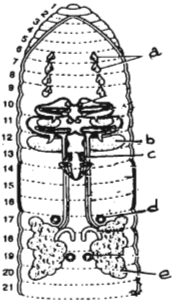
(B) first and the clitellum

(C) first segment

(D) clitellum and last segments

(E) first, clitellum and last segments

109. In the diagram of the reproductive system of Earthworm a, b, c, d and e represents:



(A) a. Seminal vesicle, b. spermathecae, c. prostrate gland, d. ovary and e. accessory gland

(B) a. Seminal vesicle, b. ovary, c. accessory gland, d. spermathecae and e. prostrate gland

(C) a. Spermathecae, b. seminal vesicle, c. accessory gland, d. ovary and e. prostrate gland

(D) a. Spermathecae, b. seminal vesicle, c. ovary, d. accessory gland and e. prostrate gland

(E) a. Ovary, b. seminal vesicle, c. accessory gland, d. prostrate gland and e. spermathecae

110. Read the statements with regard to frog:

1. The medulla oblongata passes out through foramen of Monro and continues into spinal cord
2. Vasa efferentia are 10-12 in number that arise from testes
3. Ovaries have no functional connection with kidneys
4. Frogs are uricotelic

Of the above statements,

(A) 1, 2 and 3 are correct but 4 is wrong

(B) 1 and 2 are correct while 3 and 4 are wrong

(C) 2 and 3 are correct while 1 and 4 are wrong

(D) 2, 3 and 4 are correct while 1 is wrong

(E) 3 and 4 are correct while 1 and 2 are wrong

111. About how many times does the nymph of the *Periplaneta americana* undergo moulting before becoming an adult?

(A) 4
(B) 2
(C) 17
(D) 3
(E) 13

112. Fibroblasts, macrophages and mast cells are seen in:

(A) Epithelial tissue
(B) Connective tissue
(C) Skeletal muscle tissue
(D) Smooth muscle tissue
(E) Neural tissue

113. The type of epithelium seen in the walls of blood vessels is:

(A) Squamous epithelium
(B) Columnar epithelium
(C) Ciliated epithelium
(D) Cuboidal epithelium
(E) Compound epithelium

114. During meiosis, the alleles of the parental pair separate or segregate from each other. How many allele(s) are then transmitted to a gamete?

(A) Four
(B) Two
(C) Six
(D) One
(E) Eight

115. The double helical model of the DNA was proposed by Watson and Crick based on what data produced by Wilkins and Franklin?

(A) Hybridization
(B) DNA sequencing
(C) Southern blotting
(D) Fourier's transformation
(E) X-ray diffraction

116. The pyrimidine base which confers additional stability to DNA over RNA is:

(A) Adenine
(B) Guanine
(C) Cytosine
(D) Thymine
(E) Uracil

117. Experimental verification of the Chromosomal Theory of Inheritance was given by:

(A) Gregor Johann Mendel
(B) Hugo de Vries
(C) Langdon Down
(D) Henking
(E) Thomas Hunt Morgan

118. The chromosomal condition in Turner's syndrome is:

(A) 21 Trisomy with XY
(B) 44 Autosomes + XXY
(C) 44 Autosomes + XYY
(D) 44 Autosomes + XO
(E) 18 Trisomy with XY

119. Methyl guanosine triphosphate is associated with:

(A) Point mutation
(B) Tautomerism
(C) Capping
(D) Okazaki fragments
(E) Tailing

120. Consider the following statements:

In eukaryotes

(i) RNA polymerase I transcribes rRNAs
(ii) RNA polymerase II transcribes snRNAs
(iii) RNA polymerases III trancribes hnRNA
(iv) RNA polymerase II transcribes hnRNA

(A) (i) and (ii) are correct
(B) (i) and (iii) are correct
(C) (i), (ii) and (iv) are correct
(D) (ii) and (iii) are correct
(E) (i) and (iv) are correct