No. of printed pages: 11

CLASS - XI
ANNUAL EXAM (2024 - 25)
SUBJECT – BIOLOGY (044)
SET – B1

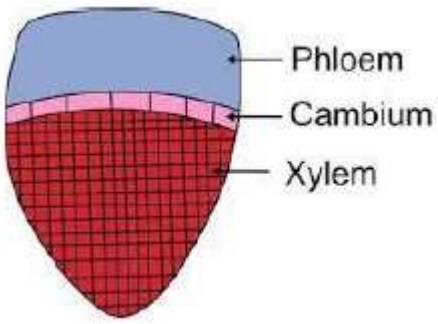
Time: 3 hours **M. Marks: 70**

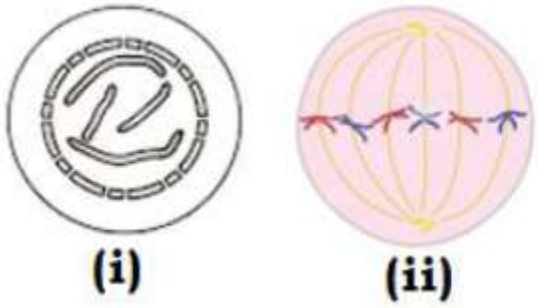
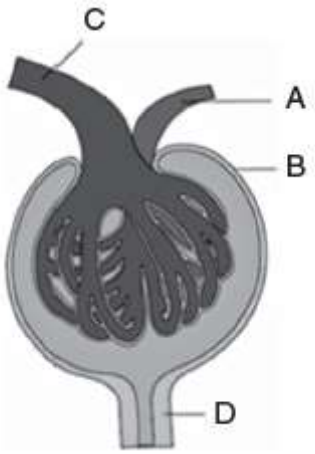
General Instructions:

i. This question paper has five sections and 33 questions.
ii. All questions are compulsory.
iii. Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
iv. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
v. Wherever necessary, neat and properly labeled diagrams should be drawn.

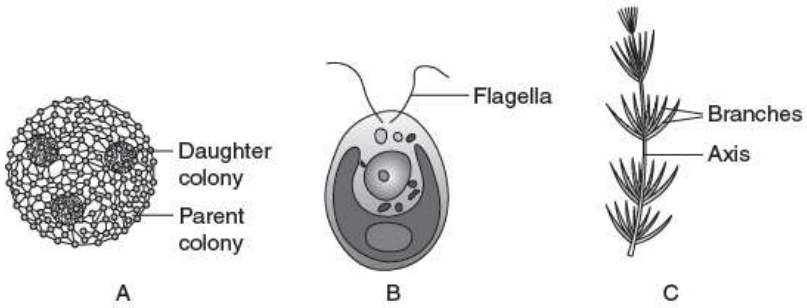
Section – A

Q. No. 1 to 12 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.

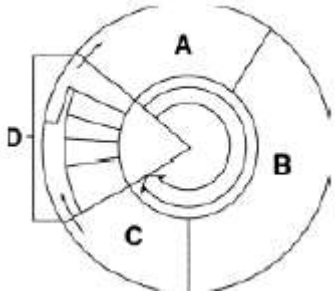
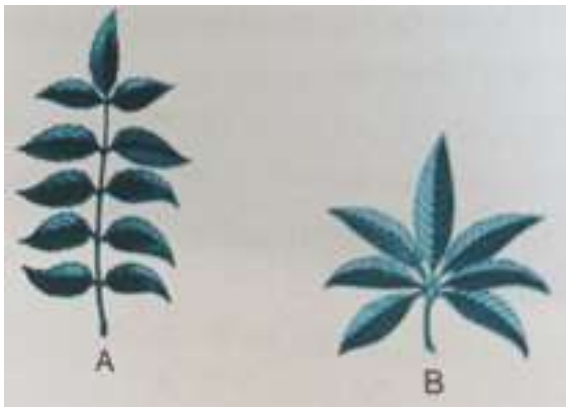
Q. No.	Question	Marks
1.	A patient with blood group 'A' was injured in an accident and has lost a lot of blood during injury. Which blood group the doctor should effectively use in this case? (a) AB (b) A/O (c) B/O (d) AB/A/B	1
2.	The vascular bundle shown in the diagram is most likely to be seen in:  	1

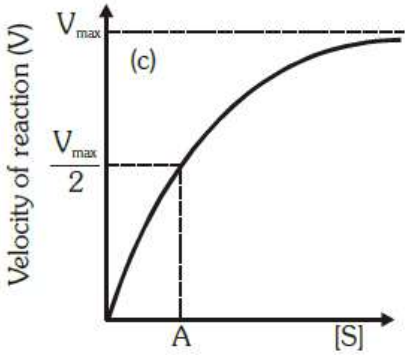
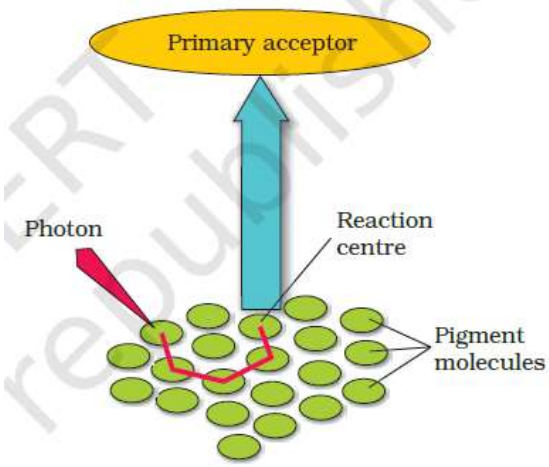
	(a) Monocot stem (b) Dicot stem (c) Monocot root (d) Dicot root	
3.	What is the first product of TCA cycle? (a) Acetyl CoA (b) Citric acid (c) Isocitric acid (d) OAA	1
4.	Identify the stages (i) & (ii) of mitosis shown below:  (a) (i) Early prophase, (ii) metaphase (b) (i) Late prophase, (ii) transition to metaphase (c) (i) Early prophase, (ii) transition to metaphase (d) (i) Late prophase, (ii) metaphase	1
5.	The following diagram represents the Malpighian body. Identify A to D.  (a) A–Efferent arteriole, B–Afferent arteriole, C–Bowman's capsule, D–DCT (b) A–Afferent arteriole, A–Efferent arteriole, C–Renal corpuscle, D–Proximal convoluted tubule (c) A–Efferent arteriole, B–Bowman's capsule, C– Afferent arteriole, D–PCT (d) A–Afferent arteriole, B–Efferent arteriole, C–Bowman's capsule, D–DCT	1

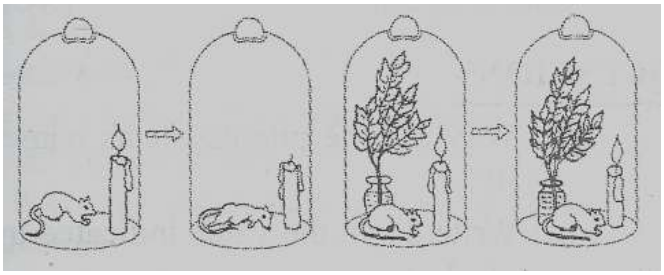
6.	Compared to those of humans, the erythrocytes in frog are (a) Without nucleus but with haemoglobin (b) Nucleated and with haemoglobin (c) Very much smaller and fewer (d) Nucleated and without haemoglobin	1
7.	Match the abnormal conditions given in Column A with their explanations given in Column B and choose the correct option: Column I Column II (A) Glycosuria (i) Accumulation of uric acid in joints (B) Renal calculi (ii) Inflammation in glomeruli (C) Glomerular nephritis (iii) Mass of crystallized salts within the kidney (D) Gout (iv) Presence of glucose in urine (a) A – i, B – iii, C – ii, D – iv (b) A – iii, B – ii, C – iv, D – i (c) A – iv, B – iii, C – ii, D – i (d) A – iv, B – ii, C – iii, D – i.	1
8.	What will be the value of RQ for the following equation? **$2(C_{31}H_{28}O_6)$ + 145 O_2 → 102 CO_2 + 98 H_2O + Energy** (a) 0.9 (b) 1 (c) 0.8 (d) 0.7	1
9.	Match the columns: **Column I** **Column II** (A) Inflammation of joints – (1) H-zone (B) Protein of thick filament – (2) Myosin (C) Protein of thin filament – (3) Actin (D) The central part of thick filament is not overlapped by thin filament – (4) Arthritis (a) A–1, B–2, C–3, D–4 (b) A–1, B–3, C–2, D–4 (c) A–4, B–1, C–2, D–3 (d) A–4, B–2, C–3, D–1	1
10.	Which of the following structure or region is **incorrectly** paired with its function? (a) Medulla oblongata: Controls respiration and cardiovascular reflexes. (b) Limbic system: Consists of fibre tracts that interconnect different regions of brain; controls movement. (c) Hypothalamus: Production of releasing hormones and regulation of temperature, hunger and thirst. (d) Corpus callosum: Band of fibres connecting left and right cerebral hemispheres.	1

11.	Identify a, b, c in the diagram:  (a) A– *Volvox*, B – *Chlamydomonas*, C – *Chara* (b) A– *Chara*, B–*Volvox*, C– *Chlamydomonas* (c) A– *Chlamydomonas*, B– *Chara*, C– *Volvox* (d) A– *Chara*, B– *Chlamydomonas*, C–*Volvox*	1
12.	Characteristic features of Euglenoids are A. Presence of cell wall B. Presence of two flagella C. Photosynthetic in presence of sunlight D. Presence of pellicle on their cell (a) A and D only (b) B and D only (c) B, C and D only (d) All of these	1
13.	**Assertion**: Bacterial cell walls are not like the plant cell. **Reason**: Bacterial cell wall is not made up of cellulose A. Both assertion and reason are true, and the reason is the correct explanation of the assertion. B. Both assertion and reason are true, but the reason is not the correct explanation of the assertion. C. Assertion is true but reason is false. D. Both assertion and reason are false.	1
14.	**Assertion**: Chitin is homopolymer. **Reason**: Chitin is made up of only one type of monomer i.e. N-acetylglucosamine. A. Both assertion and reason are true, and the reason is the correct explanation of the assertion. B. Both assertion and reason are true, but the reason is not the correct explanation of the assertion. C. Assertion is true but reason is false. D. Both assertion and reason are false.	1
15.	**Assertion**: Digestive system of Platyhelminthes is incomplete. **Reason**: They have single opening to outside of the body, serve as both mouth as well as anus.	1

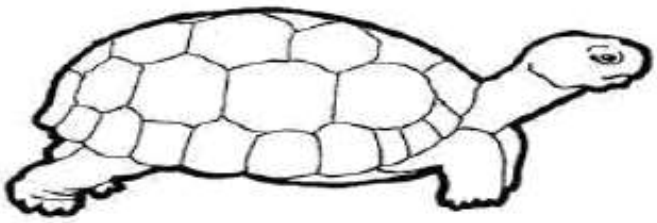
	A. Both assertion and reason are true, and the reason is the correct explanation of the assertion. B. Both assertion and reason are true, but the reason is not the correct explanation of the assertion. C. Assertion is true but reason is false. D. Assertion is false but reason is true.	
16.	**Assertion**: Ciliary movement occurs in most of our internal tubular organs which are lined by ciliated epithelium. **Reason**: Passage of ova through the female reproductive tract is also facilitated by the ciliary movement. A. Both assertion and reason are true, and the reason is the correct explanation of the assertion. B. Both assertion and reason are true, but the reason is not the correct explanation of the assertion. C. Assertion is true but reason is false. D. Both assertion and reason are false.	1
	Section – B	
17.	***Attempt either option A or B.*** **A.** Observe the diagram and answer the questions that follow:  (a) Identify the organism shown above. Write its common & scientific name. (b) Name the kingdom & the respective class it belongs to. **OR** **B.** How do lichens exhibit symbiosis?	2
18.	A cell cycle is a series of events that takes place in a cell as it grows and divides. (a) Observe the following cell cycle diagram and identify the phases of it labeled as A & B.	2

	 (b) In which phase replication of DNA occurs? If a cell has 20 chromosomes, what would be number of chromosomes at the end of this phase?	
19.	***Attempt either option A or B.*** **A.** Two types of compound leaves are shown below:  (a) Identify the types of compound leaves, A and B. (b) Give an example of each. **OR** **B.** Provide the scientific term for the following: (a) The flat & expanded portion of a leaf. (b) The roots which come above the surface of soil to absorb air. (c) A sterile stamen. (d) The roots which arise from parts of the plant other than the radicle.	2
20.	***Attempt either option A or B.*** **A.** Give reason as to why starch is stained blue with iodine, but cellulose is not, though both are polymers of glucose. **OR**	2

	B. a) What does A represent in the given diagram?  b) How does substrate concentration affect the velocity of the enzymatic reaction?	
21.	*Brassica campestris* Linn (a) What do the first two parts of the name denote? (b) What is the meaning of Linn written at the end of the name?	2
	Section – C	
22.	A blood vessel in the liver has blood with PO_2 of 45 mm Hg, which is much higher than the PO_2 of the tissues in the liver. Does the O_2 diffuse into the blood from the tissues or diffuse from the blood into the tissues. Where is the Zn enzyme – carbonic anhydrase present in a human body? Mention its function.	3
23.	Mention any three differences between stem hairs & root hairs.	3
24.	A diagrammatic representation of a Light Harvesting Complex (LHC) is shown in the figure given below. Answer the following questions.  a) Name the pigment that forms the reaction centre. b) Name the reaction centre of Photosystem I and Photosystem II. Why are they called so? c) Which of the photosystems, PS I or PS II is involved in cyclic photophosphorylation.	3

25.	Why has the mouse survived in the setup B but died in the first setup A? Who concluded this experiment? What did he conclude from this experiment? 	3
26.	Mitosis accomplishes not only the segregation of duplicated chromosomes to daughter nuclei, but the cell itself divides into two daughter cells, by cytokinesis. In animal cells, cytokinesis occurs with the appearance of a furrow in the cell membrane that deepens and joins in the centre to divide the cell, but in plants it is different. a) Why cannot the plant cells divide the same way as animal cells? b) Name the precursor of cell wall in plant cells. What does it represent in the cell wall? c) What will be the consequence, if cytokinesis does not follow karyokinesis? Give an example.	3
27.	Mammals and birds (Aves) are vertebrates and homoiothermous. They show double circulation, but differ in many other aspects. (a) Write any two adaptations / modifications, a bird has, for its aerial mode of life. (b) Bring out any two differences between Aves and mammals.	3
28.	Justify giving reasons: (a) Flower of *Cassia* is described as Zygomorphic. (b) Flowers of Mustard are referred to as hypogynous. (c) Corolla of *Solanum* is described as gamopetalous.	3
Section – D **Q.no 29 and 30 are case based questions. Each question has subparts with internal choice in one subpart.**		
29.	Refer to the CBC report of person 2, aged 35 years given below & answer the questions that follow:	4

	CBC report – Person 2, Aged 35 **Parameter** / **Result** / **Reference Range** **Hemoglobin (Hb)** / 10.5 g/dL / 13.5–17.5 g/dL **Total Leukocyte Count (WBC)** / 2,000 cells/µL / 4,000–11,000 cells/µL **Differential Leukocyte Count** / **Result** / **Reference Range** **Neutrophils** / 30% / 40%–70% **Lymphocytes** / 10% / 20%–40% **Monocytes** / 6% / 2%–8% **Eosinophils** / 1% / 1%–6% **Basophils** / 0.5% / 0.1%–2% **Red Blood Cells (RBC)** / 3.2 million/µL / 4.7–6.1 million/µL **Platelet Count** / 90,000/µL / 150,000–450,000/µL (a) Write any two abnormalities do you observe in cell % or numbers? (1) (b) Name the (i) most abundant and (b) the least among the leucocytes in human blood. (1) ***Attempt either subpart (c) or (d)*** (c) Mention the two functions, the eosinophils perform. (2) **OR** (d) What is the life span of RBCs? Name their graveyard. (2)	
30.	Plants need sunlight, water, oxygen, minerals for their growth and development. These are external factors. Apart from these, there are some intrinsic factors that regulate the growth and development of plants. These are called plant hormones or "Phytohormones". Phytohormones are chemical compounds present in very low concentrations in plants. They regulate plant development, growth, longevity and reproductive processes. Plant hormones are chemical compounds present in very low concentration in plants. They are derivatives of indole (auxins), terpenes (Gibberellins), adenine (Cytokinins), carotenoids (Abscisic acid) and gases (Ethylene). These hormones are produced in almost all parts of the plant and are transmitted to various parts of the plant. They may act synergistically or individually. Roles of different hormones can be complementary or antagonistic. Hormones play an important role in the processes like vernalisation, phototropism, seed germination, dormancy etc. along with extrinsic factors. Synthetic plant hormones are exogenously applied for controlled crop production. Based on their action, plant hormones are categorised into two categories: Plant growth promoters & Plant growth inhibitors. (a) A gardener finds some broad – leaved dicot weeds growing in his lawns. What can be done to get rid of the weeds efficiently? (1) (b) What would be expected to happen, if you forgot to add cytokinin to the culture medium? (1)	4

	Attempt either subpart (c) or (d) (c) Name the source from which the first Kinetin was isolated. What is it chemically? (2) **OR** (d) Name the growth regulator which was isolated from corn - kernels. What is it chemically? (2)	
	Section – E	
31.	***Attempt either option A or B*** **A.** What is a synapse? Explain with the help of diagram, the transmission of nerve impulse across a synapse. **OR** **B.** Schematically represent the mechanism of action of steroid hormone like estrogen.	5
32.	***Attempt either option A or B*** **A.** Explain any five classes of enzymes with their functions. **OR** **B.** Based on the position of centromere, describe the four types of chromosomes along with their diagrams.	5
33.	***Attempt either option A or B*** **A.** (i) Identify the organism shown below and its class.  (ii) Mention any six identifying features of the class to which it belongs to. (iii) Give two more examples of this class. **OR** **B.** Answer the following questions with reference to gymnosperms: (a) Name the tallest tree species of gymnosperms. Write its scientific name.	5

	(b) Enumerate two adaptations in the leaves of conifers (gymnosperms) to check excess loss of water. (c) Which out of the two can fix atmospheric nitrogen – Mycorrhiza of *Pinus* or Coralloid roots of *Cycas*? Why? (d) What technical term is given to the reduced male gametophyte of gymnosperms?	