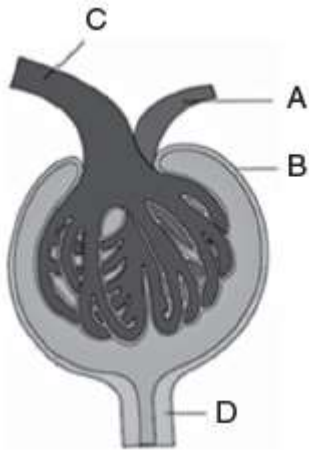
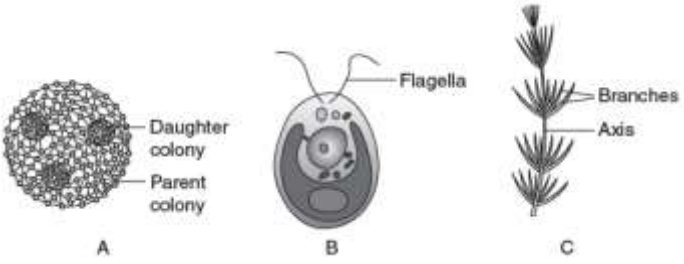

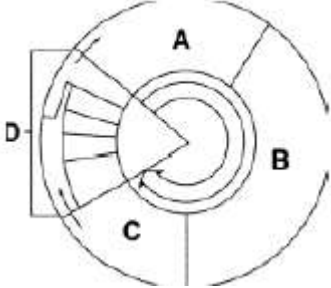
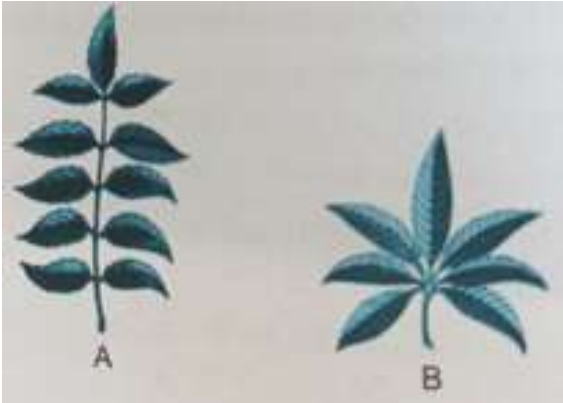


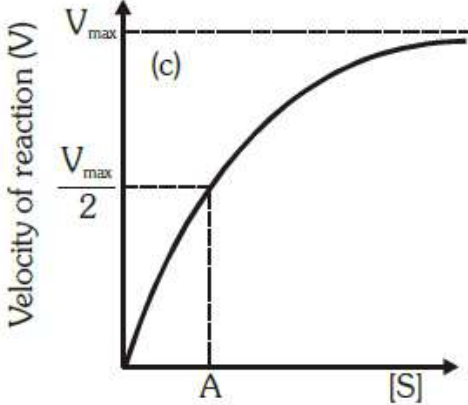
		<p>(a) A–Interphase, B–Telophase, C–Anaphase (b) A–Anaphase, B–Telophase, C–Interphase (c) A–Telophase, B–Interphase, C–Anaphase (d) A–Interphase, B–Anaphase, C–Telophase</p>	1										
5.	8	<p>The following diagram represents the Malpighian body. Identify A to D.</p>  <p>(a) A–Efferent arteriole, B–Afferent 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</p>	1										
6.	7	<p>Compared to those of humans, the erythrocytes in frog are</p> <p>(a) Without nucleus but with haemoglobin (b) Nucleated and with haemoglobin (c) Very much smaller and fewer (d) Nucleated and without haemoglobin</p>	1										
7.	6	<p>Match the abnormal conditions given in Column A with their explanations given in Column B and choose the correct option:</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">Column I</td> <td style="text-align: center;">Column II</td> </tr> <tr> <td>(A) Glycosuria</td> <td>(i) Accumulation of uric acid in joints</td> </tr> <tr> <td>(B) Renal calculi</td> <td>(ii) Inflammation in glomeruli</td> </tr> <tr> <td>(C) Glomerular nephritis</td> <td>(iii) Mass of crystallized salts within the kidney</td> </tr> <tr> <td>(D) Gout</td> <td>(iv) Presence of glucose in urine</td> </tr> </table> <p>(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.</p>	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	1
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8.	5	<p>What will be the value of RQ for the following equation? $2(C_{31}H_{28}O_6) + 145 O_2 \rightarrow 102 CO_2 + 98 H_2O + \text{Energy}$</p> <p>(a) 0.9 (b) 1 (c) 0.8 (d) 0.7</p>	1										
9.	4	<p>Match the columns:</p> <table border="0"> <thead> <tr> <th>Column I</th> <th>Column II</th> </tr> </thead> <tbody> <tr> <td>(A) Inflammation of joints</td> <td>– (1) H-zone</td> </tr> <tr> <td>(B) Protein of thick filament</td> <td>– (2) Myosin</td> </tr> <tr> <td>(C) Protein of thin filament</td> <td>– (3) Actin</td> </tr> <tr> <td>(D) The central part of thick filament is not overlapped by thin filament</td> <td>– (4) Arthritis</td> </tr> </tbody> </table> <p>(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</p>	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	1
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10.	3	<p>Which of the following structure or region is incorrectly paired with its function?</p> <p>(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.</p>	1										
11.	2	<p>Identify a, b, c in diagram:</p>  <p>(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</p>	1										
12.	1	<p>SET B1</p> <p>Characteristic features of Euglenoids are</p> <p>A. Presence of cell wall B. Presence of two flagella C. Photosynthetic in presence of sunlight D. Presence of pellicle on their cell</p>											

		<p>(a) A and D only (b) B and D only (c) B, C and D only (d) All of these</p> <p><u>SET B2</u></p> <p>Characteristic features of Slime moulds are A. Saprophytes B. Forms plasmodium under favourable condition C. Spores possess true walls D. Spores are dispersed by water E. Body moves along decaying twigs and leaves engulfing organic matter.</p> <p>(a) All except E (b) All except D (c) All except C and E (d) All except B</p>	<p>1</p> <p>1</p>
13.	16	<p>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.</p>	1
14.	15	<p>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.</p>	1
15.	14	<p>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. 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.</p>	1

16.	13	<p>Assertion: Ciliary movement occurs in most of our internal tubular organs which are lined by ciliated epithelium.</p> <p>Reason: Passage of ova through the female reproductive tract is also facilitated by the ciliary movement.</p> <p>A. Both assertion and reason are true, and the reason is the correct explanation of the assertion.</p> <p>B. Both assertion and reason are true, but the reason is not the correct explanation of the assertion.</p> <p>C. Assertion is true but reason is false.</p> <p>D. Both assertion and reason are false.</p>	1
17.	21	<p><u>Attempt either option A or B.</u></p> <p>A. Observe the diagram and answer the questions that follow:</p>  <p>(a) Identify the organism shown above. Write its common & scientific name.</p> <p>(b) Name the kingdom & the respective class it belongs to.</p> <p>(a) Common name – Mushroom Scientific name - <i>Agaricus</i></p> <p>(b) Kingdom – Fungi Class - Basidiomycetes</p> <p style="text-align: center;">OR</p> <p>B. How do lichens exhibit symbiosis?</p> <ul style="list-style-type: none"> • Lichens are symbiotic associations between algae and fungi. • The algal component (phycobiont) is autotrophic and prepares food for fungi. • The fungal component (mycobiont) is heterotrophic and absorbs mineral nutrients and water for the alga & also provides protection to the alga. 	<p style="text-align: right;">$\frac{1}{2} \times 4$</p> <p style="text-align: right;">$\frac{1}{2}$</p> <p style="text-align: right;">$\frac{1}{2} + \frac{1}{2}$</p>

18.	20	<p>A cell cycle is a series of events that takes place in a cell as it grows and divides.</p> <p>(a) Observe the following cell cycle diagram and identify the phases of it labeled as A & B.</p>  <p>(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?</p> <p>(a)</p> <p>A- G1 Phase B- S Phase</p> <p>(b) DNA Replication takes place in B / S Phase. Number of chromosomes will remain same as 20.</p>	$\frac{1}{2} \times 4=2$
19.	19	<p><u>Attempt either option A or B.</u></p> <p>A.</p> <p>Two types of compound leaves are shown below:</p>  <p>(a) Identify the types of compound leaves, A and B. (b) Give an example of each.</p> <p>(a) A – Pinnately compound leaf B – Palmately compound leaf</p> <p>(b) A – e.g. Neem B – e.g. Silk cotton</p>	$\frac{1}{2} \times 4=2$

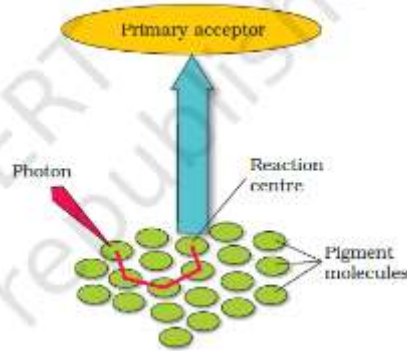
		<p style="text-align: center;">OR</p> <p>B. Provide the scientific term for the following: (a) The flat & expanded portion of a leaf. (b) The roots which come above the surface of soil to absorb air. (c) A sterile stamen. (d) The roots which arise from parts of the plant other than the radicle.</p> <p>(a) Lamina (b) Pneumatophores (c) Staminode (d) Adventitious roots</p>	$\frac{1}{2} \times 4 = 2$
20.	18	<p><u>Attempt either option A or B.</u></p> <p>A. Give reason as to why starch is stained blue with iodine, but cellulose is not, though both are polymers of glucose.</p> <ul style="list-style-type: none"> • Starch forms helical secondary structures; it can hold iodine molecules in the helical portions and the starch-iodine complex is blue in color. • But cellulose does not contain complex helices; it cannot hold iodine molecules and hence is not stained by iodine. <p style="text-align: center;">OR</p> <p>B. a) What does A represent in the given diagram?</p> <div style="text-align: center;">  </div> <p>b) How does substrate concentration affect the velocity of the enzymatic reaction?</p>	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$

		<p>a) K_m</p> <p>b) With the increase in substrate concentration, the velocity of the enzymatic reaction rises at first. The reaction ultimately reaches a maximum velocity (V_{max}) which is not exceeded by any further rise in concentration of the substrate. This is because the enzyme molecules are fewer than the substrate molecules and after saturation of these molecules, there are no free enzyme molecules to bind with the additional substrate molecules.</p>	<p>½</p> <p>½ x 3 = 1 ½</p>										
21.	17	<p><i>Brassica campestris</i> Linn</p> <p>(a) What do the first two parts of the name denote?</p> <p>(b) What is the meaning of Linn written at the end of the name?</p> <p>(a) Generic name and specific name.</p> <p>(b) It indicates that this species was first described by Linnaeus.</p>	<p>½ + ½</p> <p>1</p>										
22.	28	<p>(a) A blood vessel in the liver has blood with PO₂ of 45 mm Hg, which is much higher than the PO₂ of the tissues in the liver. Does the O₂ diffuse into the blood from the tissues or diffuse from the blood into the tissues.</p> <p>(b) Where is the Zn enzyme – carbonic anhydrase present in a human body? Mention its function.</p> <p>(a) O₂ diffuses into the tissues.</p> <p>(b) Carbonic anhydrase is present in RBCs.</p> <div style="background-color: yellow; padding: 5px; text-align: center;"> $\text{CO}_2 + \text{H}_2\text{O} \xrightleftharpoons{\text{Carbonic anhydrase}} \text{H}_2\text{CO}_3 \xrightleftharpoons{\text{Carbonic anhydrase}} \text{HCO}_3^- + \text{H}^+$ </div>	<p>1 + 1 + 1</p>										
23.	27	<p>Mention any three differences between stem hairs & root hairs.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: left;">Stem hair</th> <th style="width: 50%; text-align: left;">Root hair</th> </tr> </thead> <tbody> <tr> <td>It is a multicellular structure.</td> <td>It is a unicellular structure.</td> </tr> <tr> <td>Stem hairs are cutinized.</td> <td>Root hairs are not cutinized.</td> </tr> <tr> <td>They may be branched.</td> <td>They are unbranched.</td> </tr> <tr> <td>Function – Help to check water loss by transpiration & are secretory.</td> <td>Function – Help in absorbing water & minerals from the soil.</td> </tr> </tbody> </table> <p style="text-align: right;">(Any 3 differences)</p>	Stem hair	Root hair	It is a multicellular structure.	It is a unicellular structure.	Stem hairs are cutinized.	Root hairs are not cutinized.	They may be branched.	They are unbranched.	Function – Help to check water loss by transpiration & are secretory.	Function – Help in absorbing water & minerals from the soil.	<p>1 + 1 + 1</p>
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24. 26

SET B1

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.

a) **Chlorophyll a.**

1/2

b) **In PS I, the reaction centre chlorophyll a has an absorption peak at 700 nm, hence is called P₇₀₀, while in PS II, reaction centre has an absorption peak at 680 nm and is called P₆₈₀.**

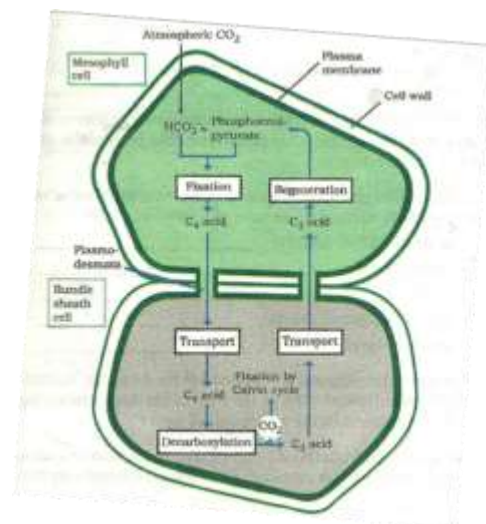
2

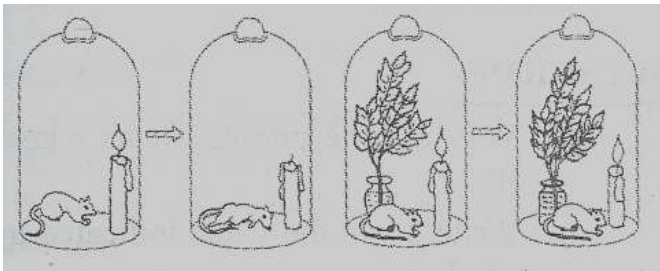
c) **PS I is involved in cyclic photophosphorylation.**

1/2

SET B2

Observe the diagram and answer the following questions:



		<p>(a) Which group of plants exhibit these two types of cells?</p> <p>(b) What is the first product of C4 cycle?</p> <p>(c) Which enzyme is present in bundle sheath cells and mesophyll cells respectively?</p> <p>(d) What is the basis for designating C₃ & C₄ pathways of photosynthesis?</p> <p>(a) C₄ plants</p> <p>(b) Oxaloacetic acid</p> <p>(c) Mesophyll cells have PEP Carboxylase and bundle sheath cells have RuBP Carboxylase.</p> <p>(d) The number of carbon atoms in the first stable product of photosynthesis.</p>	<p>1/2</p> <p>1/2</p> <p>1/2 + 1/2</p> <p>1</p>
25.	25	<p>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?</p>  <p style="text-align: center;">Experimental setup A Experimental setup B</p> <ul style="list-style-type: none"> In set up B, the plant carries out photosynthesis, using the carbon dioxide liberated by the mouse and the burning candle and liberates oxygen. Since O₂ is made available, the mouse survived. Joseph Priestley conducted the experiment. He concluded that plants restore to air whatever the breathing animals and the burning candles remove. 	<p>1</p> <p>1/2</p> <p>1/2</p> <p>1</p>
26.	24	<p>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.</p> <p>a) Why cannot the plant cells divide the same way as animal cells?</p> <p>b) Name the precursor of cell wall in plant cells. What does it represent in the cell wall?</p> <p>c) What will be the consequence, if cytokinesis does not follow karyokinesis? Give an example.</p>	

		<p>a) Since the plant cells have an inextensible rigid cell wall, they cannot undergo cytokinesis as animal cells do.</p> <p>b) Cell-plate is the precursor of cell wall. It represents the middle lamella.</p> <p>c) If karyokinesis is not followed by cytokinesis, it will lead to the formation of a multinucleate cell (syncytium) e.g. liquid endosperm in coconut.</p>	<p>1</p> <p>$\frac{1}{2} + \frac{1}{2}$</p> <p>$\frac{1}{2} + \frac{1}{2}$</p>																		
27.	23	<p>Mammals and birds (Aves) are vertebrates and homoiothermous. They show double circulation, but differ in many other aspects.</p> <p>(a) Write any two adaptations / modifications, a bird has, for its aerial mode of life.</p> <p>(b) Bring out any two differences between Aves and mammals.</p> <p>(a) Forelimbs modified into wings that are covered by feathers.</p> <p>Hollow bones are hollow with air cavities, i.e. pneumatic. This reduces the weight of the body.</p> <p>(b) Differences between Aves & Mammals:</p> <table border="1"> <thead> <tr> <th>S. No.</th> <th>AVES</th> <th>MAMMALS</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Jaws are modified into beak and teeth are absent.</td> <td>Both upper & lower jaws possess teeth.</td> </tr> <tr> <td>2.</td> <td>Skin glands & hair are absent.</td> <td>Skin glands & hair are present.</td> </tr> <tr> <td>3.</td> <td>Long bones are hollow & filled with air cavities, i.e., pneumatic.</td> <td>Bones are not pneumatic.</td> </tr> <tr> <td>4.</td> <td>Air sacs are connected to lungs to supplement respiration.</td> <td>Air sacs are absent.</td> </tr> <tr> <td>5.</td> <td>They are oviparous.</td> <td>Animals are viviparous with a very few exceptions.</td> </tr> </tbody> </table> <p>(Any two differences)</p>	S. No.	AVES	MAMMALS	1.	Jaws are modified into beak and teeth are absent.	Both upper & lower jaws possess teeth.	2.	Skin glands & hair are absent.	Skin glands & hair are present.	3.	Long bones are hollow & filled with air cavities, i.e., pneumatic.	Bones are not pneumatic.	4.	Air sacs are connected to lungs to supplement respiration.	Air sacs are absent.	5.	They are oviparous.	Animals are viviparous with a very few exceptions.	<p>$\frac{1}{2} + \frac{1}{2}$</p> <p>1 + 1</p>
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28.	22	<p>Justify giving reasons:</p> <p>(a) Flower of <i>Cassia</i> is described as Zygomorphic.</p> <p>(b) Flowers of Mustard are referred to as hypogynous.</p> <p>(c) Corolla of <i>Solanum</i> is described as gamopetalous.</p>																			

		<p>(a) A flower of <i>Cassia</i> is zygomorphic because, it can be divided into two similar halves only in one particular vertical plane.</p> <p>(b) In the flower of mustard, the ovary occupies the highest position while the other floral parts are situated below it, hence, it is said to be hypogynous.</p> <p>(c) In <i>Solanum</i>, the corolla is gamopetalous, because all the petals are united together.</p>	1 + 1 + 1																																	
29.	30	<p>Refer to the CBC report of person 2, aged 35 given below & answer the questions that follow:</p> <p>CBC report – Person 2, Aged 35</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Result</th> <th>Reference Range</th> </tr> </thead> <tbody> <tr> <td>Hemoglobin (Hb)</td> <td>10.5 g/dL</td> <td>13.5–17.5 g/dL</td> </tr> <tr> <td>Total Leukocyte Count (WBC)</td> <td>2,000 cells/μL</td> <td>4,000–11,000 cells/μL</td> </tr> <tr> <th>Differential Leukocyte Count</th> <th>Result</th> <th>Reference Range</th> </tr> <tr> <td>Neutrophils</td> <td>30%</td> <td>40%–70%</td> </tr> <tr> <td>Lymphocytes</td> <td>10%</td> <td>20%–40%</td> </tr> <tr> <td>Monocytes</td> <td>6%</td> <td>2%–8%</td> </tr> <tr> <td>Eosinophils</td> <td>1%</td> <td>1%–6%</td> </tr> <tr> <td>Basophils</td> <td>0.5%</td> <td>0.1%–2%</td> </tr> <tr> <td>Red Blood Cells (RBC)</td> <td>3.2 million/μL</td> <td>4.7–6.1 million/μL</td> </tr> <tr> <td>Platelet Count</td> <td>90,000/μL</td> <td>150,000–450,000/μL</td> </tr> </tbody> </table> <p>(a) Write any two abnormalities do you observe in cell % or numbers? (1)</p> <p>(b) Name the (i) most abundant and (b) the least among the leucocytes in human blood. (1)</p> <p><u>Attempt either subpart (c) or (d)</u></p> <p>(c) Mention the two functions, the eosinophils perform. (2)</p> <p style="text-align: center;">OR</p> <p>(d) What is the life span of RBCs? Name their graveyard. (2)</p> <p>(a) Total Leucocyte Count is less, RBC count is less, Platelet count is less. (Any two) $\frac{1}{2} + \frac{1}{2}$</p> <p>(b) (i) Most abundant – Neutrophils (ii) Least - Basophils $\frac{1}{2} + \frac{1}{2}$</p> <p>(c) Eosinophils resist infections. They are also involved in allergic reactions. 1 + 1</p> <p style="text-align: center;">OR</p> <p>(d) Life span of RBCs is 120 days. Spleen is their graveyard. 1 + 1</p>	Parameter	Result	Reference Range	Hemoglobin (Hb)	10.5 g/dL	13.5–17.5 g/dL	Total Leukocyte Count (WBC)	2,000 cells/ μ L	4,000–11,000 cells/ μ L	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/ μ L	4.7–6.1 million/ μ L	Platelet Count	90,000/ μ L	150,000–450,000/ μ L	
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Red Blood Cells (RBC)	3.2 million/ μ L	4.7–6.1 million/ μ L																																		
Platelet Count	90,000/ μ L	150,000–450,000/ μ L																																		

30.	29	<p>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.</p> <p>(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)</p> <p>(b) What would be expected to happen, if you forgot to add cytokinin to the culture medium? (1)</p> <p><u>Attempt either subpart (c) or (d)</u></p> <p>(c) Name the source from which the first Kinetin was isolated. What is it chemically? (2)</p> <p style="text-align: center;">OR</p> <p>(d) Name the growth regulator which was isolated from corn - kernels. What is it chemically? (2)</p> <p>(a) Application of auxins like 2, 4 – dichlorophenoxyacetic acid (2,4 – D) can get rid of broad-leaved dicot weeds. 1</p> <p>(b) Only roots will be initiated from the callus. 1</p> <p>(c) Autoclaved Herring sperm. It is a modified form of adenine, a purine base. 1 + 1</p> <p style="text-align: center;">OR</p> <p>(d) Zeatin; it promotes cytokinesis / cell division. 1 + 1</p>	
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31.

33

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.

Synapse is the junction between two neurons, where information from one neuron is transmitted or relayed (handed over) to another neuron, but there is no protoplasmic connection.

Steps involved in the transmission of nerve impulse

When a nerve impulse passes the axon, synaptic vesicles fuse with presynaptic membrane and rupture



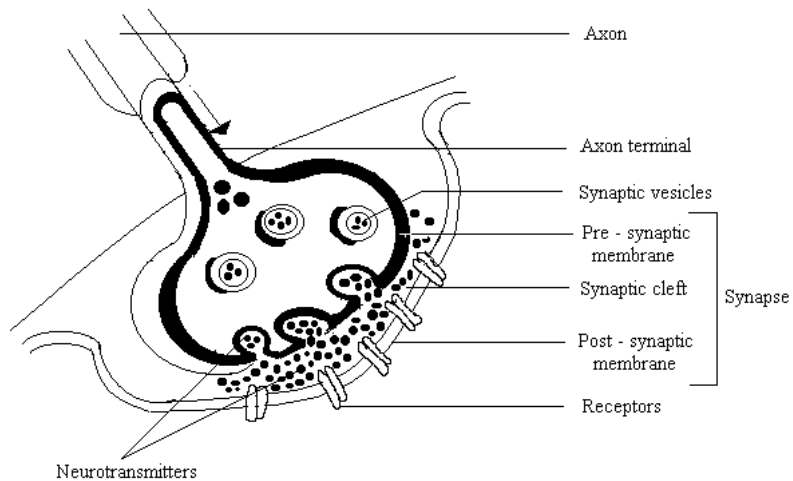
Diffusion of neurotransmitter molecules (Acetylcholine) across cleft



Neurotransmitter molecules attach to receptor sites



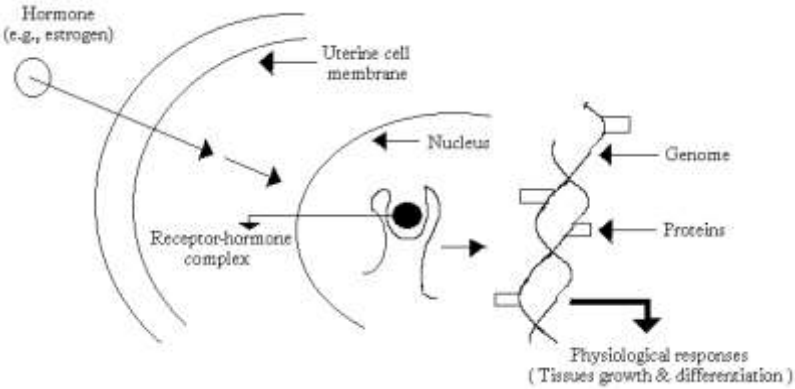
Receptor molecules trigger changes in the permeability of the postsynaptic membrane that, in turn, produce changes in the postsynaptic membrane potential. These changes, called postsynaptic potentials, can be excitatory or inhibitory, depending on the type of neurotransmitter receptor connection.

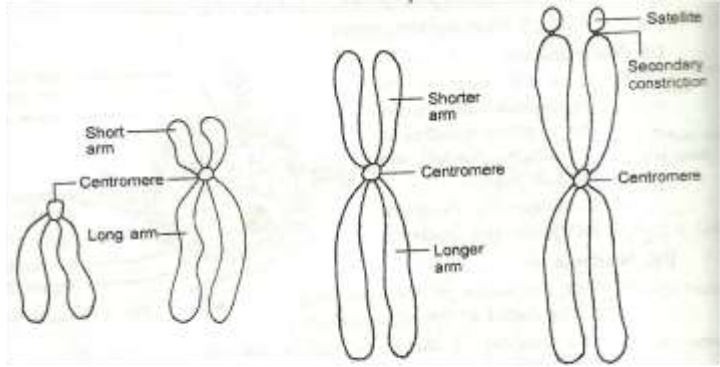


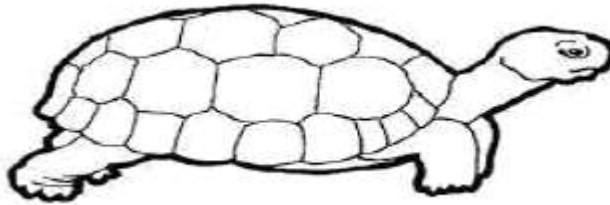
1

2

2

		<p style="text-align: center;">OR</p> <p>B. Schematically represent the mechanism of action of steroid hormone like estrogen.</p> 	5
32.	31	<p><u>Attempt either option A or B</u></p> <p>A. Explain any five classes of enzymes with their functions.</p> <p>Enzymes are grouped into six major classes:</p> <p>Class 1. Oxidoreductases – These catalyze oxidation or reduction of their substrates and act by removing or adding electrons (and/or H⁺) from or to substrates e.g., cytochrome oxidase oxidizes cytochrome.</p> <p>Class 2. Transferases – These transfer specific groups from one substrate to another, e.g., glutamate pyruvate transaminase.</p> <p>Class 3. Hydrolases – These break down large molecules into smaller ones by introduction of water (hydrolysis) and breaking of specific covalent bonds. Most digestive enzymes belong to this category, e.g., amylase which hydrolyses starch.</p> <p>Class 4. Lyases – These catalyze the cleavage of specific covalent bonds and removal of groups without hydrolysis, e.g., histidine decarboxylase cleaves C – C bond in histidine to form carbon dioxide and histamine.</p> <p>Class 5. Isomerases – These catalyze the rearrangement of molecular structure to form isomers, e.g., phosphohexose isomerase changes glucose-6-phosphate to fructose-6-</p>	1 x 5 = 5

		<p>phosphate (both are hexose phosphates).</p> <p>Class 6. Ligases – These catalyze covalent bonding of two substrates to form a large molecule. The energy for the reaction is derived from the hydrolysis of ATP. Pyruvate carboxylase combines pyruvate and carbon dioxide to form oxaloacetate at the expense of ATP.</p> <p style="text-align: right;">(Any 5)</p> <p style="text-align: center;">OR</p> <p>B.</p> <p>Based on the position of centromere, describe the four types of chromosomes along with their diagrams.</p> <p>Based on the position of the centromere, chromosomes are of four types:</p> <ul style="list-style-type: none"> • Metacentric – The centromere is right in the middle and the two arms of the chromosome are equal in length. • Submetacentric – The centromere is little away from the centre and so one arm is slightly longer than the other. • Acrocentric – The centromere is situated closer to one end, making one arm extremely short and the other arm very long. • Telocentric – The centromere is terminal and so the chromosome has only one arm. <div style="text-align: center;">  <p>a) Telocentric b) Acrocentric c) Submetacentric d) Metacentric</p> </div>	<p>2 + 2 + 1</p>
33.	32	<p><u>Attempt either option A or B</u></p> <p>A.</p> <p>a) Identify the organism shown below and its class.</p>	



- b) Mention any six identifying features of the class to which it belongs to.
 c) Give two more examples of this class.

a) **Organism - Tortoise/ Turtle, Class - Reptilia**

b) **Identifying Features: (Any six)**

- **The class name refers to their creeping or crawling mode of locomotion**
- **They are mostly terrestrial animals**
- **Their body is covered by dry and cornified skin, epidermal scales or scutes.**
- **They do not have external ear openings. Tympanum represents ear.**
- **Limbs, when present, are two pairs.**
- **Heart is usually three-chambered, but four-chambered in crocodiles.**
- **Reptiles are poikilotherms.**
- **Snakes and lizards shed their scales as skin cast.**
- **Sexes are separate. Fertilization is internal.**
- **They are oviparous and development is direct.**

c) **Examples: *Chameleon* (Tree lizard), *Calotes* (Garden lizard), *Crocodilus* (Crocodile), *Alligator* (Alligator), *Hemidactylus* (Wall lizard), Poisonous snakes – *Naja* (Cobra), *Bangarus* (Krait), *Vipera* (Viper).**

(Any two examples)

OR

B.

Answer the following questions with reference to gymnosperms:

- (a) Name the tallest tree species of gymnosperms. Write its scientific name.
 (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 –

$\frac{1}{2} + \frac{1}{2}$

$\frac{1}{2} \times 6 = 3$

$\frac{1}{2} + \frac{1}{2}$

	<p>Mycorrhiza of <i>Pinus</i> or Coralloid roots of <i>Cycas</i>? Why?</p> <p>(d) What technical term is given to the reduced male gametophyte of gymnosperms?</p> <p>(a) Redwood tree, <i>Sequoia</i></p> <p>(b) Needle-like leaves to reduce the surface area. Thick cuticle. Sunken stomata.</p> <p style="text-align: right;">(Any two points)</p> <p>(c) Coralloid roots of <i>Cycas</i> harbour symbiotic cyanobacteria, which can fix atmospheric nitrogen.</p> <p>(d) Pollen grain.</p>	<p>$\frac{1}{2} + \frac{1}{2}$</p> <p>$1 + 1$</p> <p>$\frac{1}{2} + \frac{1}{2}$</p> <p>1</p>
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