



**OSDAV Public School, Kaithal**  
**December Examination (2024-25)**  
**Class : XI**  
**Subject : Biology**

**SET-A**

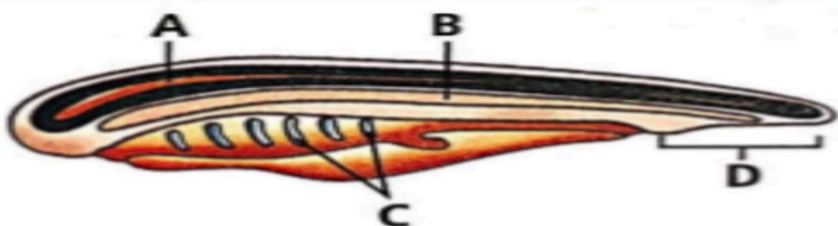
**Time: 3 Hrs .**

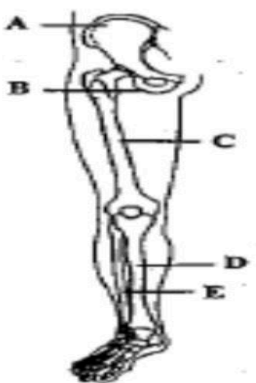
**M.M. : 70**

**General Instructions:**

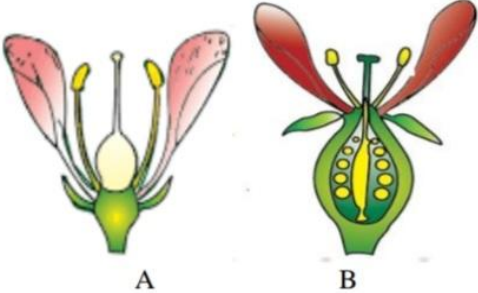
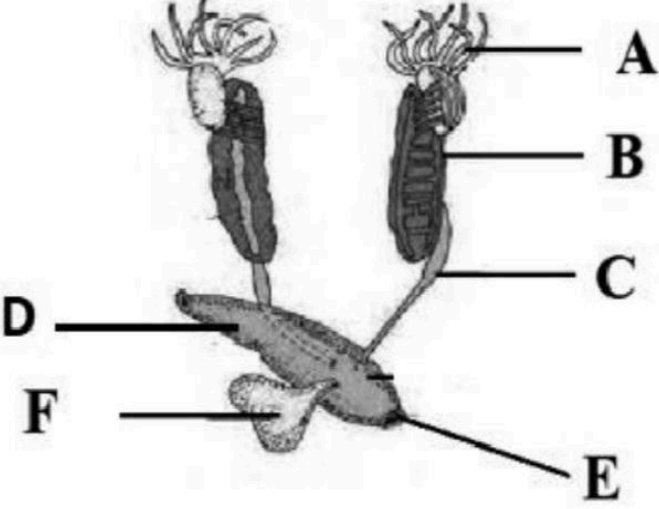
- (i) All questions are compulsory.
- (ii) The question paper has five sections and 33 questions.
- (iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E 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 labelled diagrams should be drawn.

**SECTION- A**

|            |   |          |
|------------|---|----------|
| <b>Q 1</b> | Carnivora includes:<br>(a) group of organisms belonging to related genera<br>(b) group of organisms belonging to related species<br>(c) group of organisms belonging to related families<br>(d) group of organisms which are similar in all features  | <b>1</b> |
| <b>Q 2</b> | Find out the the correctly matched pair;<br>A) marginal placentation - tomato                      B) axile presentation- pea<br>C) parietal placentation - lemon                      D) basal placentation - marigold   | <b>1</b> |
| <b>Q.3</b> | Meiotic division in pteridophytes occurs<br>(a) During gamete formation                      (b) After gamete formation<br>(c) During spore formation                      (d) After spore formation  | <b>1</b> |
| <b>Q.4</b> | Which of the following regions of the brain is incorrectly paired with its function?<br>(a) Medulla oblongata- controls respiration and cardiovascular reflexes<br>(b) Limbic system- regulates sexual behaviour and expression of emotional reactions<br>(c) Hypothalamus- produces releasing hormones and regulates temperature, hunger and thirst<br>(d) Cerebellum- maintains posture, regulates intersensory association and communication | <b>1</b> |
| <b>Q.5</b> | What is the respiratory quotient (RQ) for carbohydrates?<br>a) 0.7                      b) 1.0                      c) 0.9                      d) 0.   | <b>1</b> |
| <b>Q.6</b> | Which of the following combinations of hormones binds with intracellular receptors?<br>a. Insulin, FSH, Cortisol                      b. Glucagon, Testosterone, FSH<br>c. Thyroxine, Testosterone, Estradiol                      d. Insulin, Androgen, PTH  | <b>1</b> |
| <b>Q.7</b> | <p>Animals belonging to phylum-Chordata are fundamentally characterised by the presence of structure noted as A,B,C and D.</p>  <p>a .A-Notochord, B-Nerve cord, C-Gill slits, D-Post-anal part<br/> b. A-Nerve cord, B-Notochord, C-Gill slits, D-Post-anal part</p>   | <b>1</b> |


|             |   |          |
|-------------|---|----------|
|             | c. A-Nerve cord, B-Notochord, C-Post-anal part, D-Gill slits<br>d. A-Nerve cord, B-Gill slits, C-Notochord, D-Post-anal part  |          |
| <b>Q.8</b>  | The Golgi apparatus<br>(a)Is found in animal cells only (b)Is found in prokaryotes only<br>(c) Packages and modifies proteins (d)Is the site of rapid ATP production  | <b>1</b> |
| <b>Q.9</b>  | What is the projections called , which found inside of human kidney :-<br>a. Cortex b. Medulla c. Medullary Pyramids d. Column of Bertini   | <b>1</b> |
| <b>Q.10</b> | In Calvin cycle, 1 molecule of glucose is formed from<br>A) $6\text{CO}_2 + 30\text{ATP} + 12\text{NADPH}_2$<br>B) $6\text{CO}_2 + 12\text{ATP} + 12\text{NADPH}_2$<br>C) $6\text{CO}_2 + 18\text{ATP} + 12\text{NADPH}_2$<br>D) $6\text{CO}_2 + 18\text{ATP} + 30\text{NADPH}_2$   | <b>1</b> |
| <b>Q 11</b> | Match the columns.<br>1. PRL – A. Pigmentation of skin<br>2. LH – B. Steroid hormones<br>3. ACTH – C. Formation of milk<br>4. MSH – D. Gonadal activity<br>(A) 1-C, 2-D, 3-B, 4-A (B) 1-C, 2-D, 3A, 4-B<br>(C) 1-D, 2-C, 3-B, 4-A (D) 1-B, 2-C, 3-D, 4-A  | <b>1</b> |
| <b>Q.12</b> | Observe the diagram given below. Parts labelled as A to E respectively indicate<br><br>(a) A-Ilium, B- Ischium, C- Femur, D- Tibia, E- Fibula<br>(b) A-Ischium, B- Ilium, C- Humerus, D- Radius, E- Ulna<br>(c) A-Ilium, B- Ischium, C- Femur, D- Fibula, E- Tibia<br>(d) A-Ischium, B- Ilium, C- Femur, D- Tibia, E- Fibula  | <b>1</b> |
| <b>Q.13</b> | <b>Q.No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:</b><br><b>A. Both A and R are true and R is the correct explanation of A.</b><br><b>B. Both A and R are true and R is not the correct explanation of A.</b><br><b>C. A is true but R is false.</b><br><b>D. A is False but R is true</b><br><b>Assertion:</b> In mitochondria enzymes of electron transport are embedded in the outer membrane.<br><b>Reason:</b> Inner membrane has infoldings called cristae | <b>1</b> |
| <b>Q.14</b> | <b>Assertion:</b> Trachea does not collapse even when there is no air in it.<br><b>Reason:</b> Trachea is supported by the cartilaginous ring   | <b>1</b> |
| <b>Q.15</b> | <b>Assertion:</b> Sunflower plant has long internodes with leaves far apart.<br><b>Reason:</b> Sunflower produces a sufficient amount of gibberellins during its growing period.  | <b>1</b> |
| <b>Q.16</b> | <b>Assertion:</b> Body tissues obtain $\text{O}_2$ from oxyhaemoglobin.<br><b>Reason:</b> Dissociation of oxyhaemoglobin is caused by high $\text{O}_2$ and low $\text{CO}_2$ concentration.  | <b>1</b> |

## SECTION-B

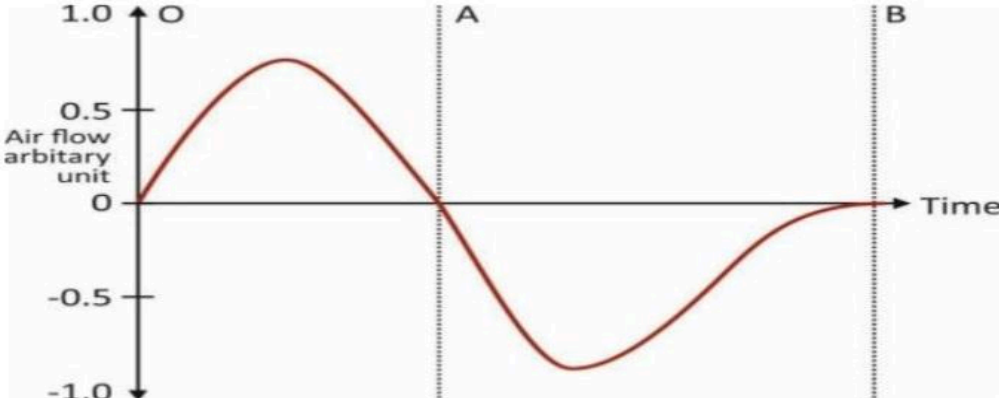
|             |   |          |
|-------------|---|----------|
| <b>Q.17</b> | Give reasons:<br>(i) The diatoms have left behind a large amount of cell wall deposits in their habitats.<br>(ii) Spores of slime moulds are extremely resistant and can survive for many years in adverse condition  | <b>2</b> |
| <b>Q.18</b> | A)What is the role of auxins in apical dominance?<br>B)How does ethylene affect fruit ripening?   | <b>2</b> |
| <b>Q.19</b> | List any four differences between mitosis and meiosis.  | <b>2</b> |
| <b>Q.20</b> | (a) Why is dicot leaf called dorsiventral and monocot leaf isobilateral?<br>(b) Identify the types of flowers A and B on the basis of the position of floral parts on thalamus.<br><br>  | <b>2</b> |
| <b>Q.21</b> | Based on the clues given below, identify and name the organ marked in the given figure<br>a. Common duct for urine and sperm.      b. Common opening for egestion and excretion.<br>c. Organ which stores urine temporarily      d. Organ which stores undigested food<br><br> | <b>2</b> |

## SECTION- C

|             |   |          |
|-------------|---|----------|
| <b>Q.22</b> | Kidneys have built-in mechanisms for regulation of their function. Explain the regulatory apparatus present in the kidney. With the help of flow charts explain its regulatory mechanism.                     | <b>3</b> |
| <b>Q.23</b> | (a)What are Plasmodesmata?<br>(b) What is a mesosome in a prokaryotic cell? State its any two functions.<br>(c) SER is mainly involved in the synthesis of which biomolecule?                                 | <b>3</b> |
| <b>Q.24</b> | Draw the graphical representation of the citric acid cycle.   | <b>3</b> |
| <b>Q.25</b> | Provide a technical term for the following:<br>a) Blood filled cavity in arthropods      b) A stinging organ of jellyfish<br>c) Free-floating form of Cnidaria      d) Lateral appendages in aquatic annelids | <b>3</b> |

|             |  |                         |          |
|-------------|--|-------------------------|----------|
|             | e) Egg laying Animals  | f) Cold blooded animals |          |
| <b>Q.26</b> | (a) How are prosthetic groups different from coenzymes?<br>(b) State the changes that take place during the action of an enzyme when the temperature is low and when the pH of the medium is optimum   |                         | <b>3</b> |
| <b>Q.27</b> | How does nerve impulse conduction occur across a synapse? Explain with a diagram.  |                         | <b>3</b> |
| <b>Q.28</b> | Anjali observed a flower and drew the following floral diagram. Based on the diagram, answer the following questions:<br><br><br>(a) Identify the type of placentation shown.<br>(b) Which type of aestivation is shown in the calyx of the flower?<br>(c) Name the type of stamens on the basis of their attachment.<br>(d) Write the floral formula for the given flower. |                         | <b>3</b> |

#### SECTION-D

|             |   |  |          |
|-------------|---|--|----------|
| <b>Q 29</b> | <p><b>CASE STUDY BASED QUESTION</b></p> <p>The autonomic regulation of the heart is a very prominent activity for cardiac muscles that beats until death. This regulation is maintained by the involvement of the Autonomic Nervous System (ANS). There is an extensive innervation of the myocardium. Cardiovascular functions are also modulated through reflex mechanism that involve baroreceptors, the chemical composition of the blood and via the release of various hormones.</p> <p>(a) Name the specific part of the brain that modulates the cardiac function.<br/>(b) Signals from which part of the ANS will increase the cardiac output in a person undergoing stress and fear of riding a giant roller coaster? What is the underlying mechanism involved?<br/>(c) Hormones released from which gland of the body increases the cardiac output?<br/>(d) Define cardiac output and mention its average volume in a healthy individual.</p> |  | <b>4</b> |
| <b>Q 30</b> | <p>The graph represents airflow in and out of the lungs during a normal breath.</p>  <p>A. Which parts of the graph represent inspiration and expiration?<br/>B. How does the relationship between the pressure in the lungs and the atmospheric pressure vary between phases OA and AB?</p>  |  | <b>4</b> |

|  |   |  |
|--|---|--|
|  | C. How is the pressure gradient generated in different phases of breathing? |  |
|--|---|--|

### SECTION-E

|             |  |          |
|-------------|--|----------|
| <b>Q.31</b> | <p>A) Explain the mechanism of cardiac cycle in human heart.</p> <p>B) people in hilly areas are often observed to have swollen necks.</p> <p>(a) Name the disease they are suffering from.</p> <p>(b) Which hormones are involved in the above disease ?</p> <p>(c) Which element is essential in our diet for appropriate secretion of above hormones ?</p> <p>(d) What can be the consequences of improper secretion of above hormones during pregnancy ?</p> | <b>5</b> |
| <b>Q.32</b> | <p>(a) Which photosynthetic pathway is common to both C3 and C4 plants? Mention the location of occurrence of this pathway in both C3 and C4 plants.</p> <p>(b) Give the schematic representation of the above pathway with explanation.</p>   | <b>5</b> |
| <b>Q.33</b> | <p>A) Describe the structure and function of the powerhouse of the cell with a well labelled diagram.</p> <p>B) Discuss the effect of A on the rate of the enzyme catalysed reaction depicted below:</p> <div data-bbox="220 676 951 985"> </div>  | <b>5</b> |



**BIOLOGY-- XI (Set A)**  
**DECEMBER EXAMINATION(24)**  
**ANSWER KEY AND MARKING SCHEME**  
**SECTION A**

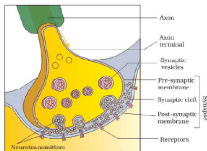
|             |   |          |
|-------------|---|----------|
| <b>Q 1</b>  | C | <b>1</b> |
| <b>Q 2</b>  | D | <b>1</b> |
| <b>Q 3</b>  | C | <b>1</b> |
| <b>Q 4</b>  | D | <b>1</b> |
| <b>Q.5</b>  | B | <b>1</b> |
| <b>Q 6</b>  | C | <b>1</b> |
| <b>Q 7</b>  | B | <b>1</b> |
| <b>Q 8</b>  | C | <b>1</b> |
| <b>Q.9</b>  | D | <b>1</b> |
| <b>Q.10</b> | C | <b>1</b> |
| <b>Q.11</b> | A | <b>1</b> |
| <b>Q.12</b> | A | <b>1</b> |
| <b>Q 13</b> | D | <b>1</b> |
| <b>Q.14</b> | A | <b>1</b> |
| <b>Q.15</b> | A | <b>1</b> |
| <b>Q.16</b> | C | <b>1</b> |

**SECTION-B**

| Q.17   | (i) The walls are embedded with silica and are indestructible.<br>(ii) Spores have true walls.  | 1<br>1  |         |              |               |                                      |                                 |  |  |                                      |   |  |  |  |   |                               |                                |             |
|--|---|---------|---------|--------------|---------------|--------------------------------------|---------------------------------|--|--|--------------------------------------|---|--|--|--|---|-------------------------------|--------------------------------|-------------|
| Q.18   | A)Auxins suppress the growth of lateral buds, promoting the dominance of the apical bud and leading to a single, main stem.<br>B)Ethylene promotes fruit ripening by increasing the activity of enzymes that soften the fruit, convert starches to sugars, and degrade chlorophyll.   | 1<br>1  |         |              |               |                                      |                                 |  |  |                                      |   |  |  |  |   |                               |                                |             |
| Q.19   | <table border="1"><thead><tr><th>Mitosis</th><th>Meiosis</th></tr></thead><tbody><tr><td>One division</td><td>Two divisions</td></tr><tr><td>Number of chromosome remain the same</td><td>Number of chromosomes is halved</td></tr><tr><td>Homologous chromosomes line up separately on the metaphase plate</td><td>Homologous chromosomes line up in pairs at the metaphase plate</td></tr><tr><td>Homologous chromosome do not pair up</td><td>Homologous chromosome pairup to form bivalent</td></tr><tr><td>Chiasmata do not form and crossing over never occurs</td><td>Chiasmata form and crossingover occurs</td></tr><tr><td>Daughter cells are genetically identical</td><td>Daughter cells are genetically different from parent cell</td></tr><tr><td>Two daughter cells are formed</td><td>Four daughter cells are formed</td></tr></tbody></table> <p>Any four</p> | Mitosis | Meiosis | One division | Two divisions | Number of chromosome remain the same | Number of chromosomes is halved | Homologous chromosomes line up separately on the metaphase plate | Homologous chromosomes line up in pairs at the metaphase plate | Homologous chromosome do not pair up | Homologous chromosome pairup to form bivalent | Chiasmata do not form and crossing over never occurs | Chiasmata form and crossingover occurs | Daughter cells are genetically identical | Daughter cells are genetically different from parent cell | Two daughter cells are formed | Four daughter cells are formed | 1/2×4=<br>2 |
| Mitosis  | Meiosis   |         |         |              |               |                                      |                                 |  |  |                                      |   |  |  |  |   |                               |                                |             |
| One division   | Two divisions   |         |         |              |               |                                      |                                 |  |  |                                      |   |  |  |  |   |                               |                                |             |
| Number of chromosome remain the same                             | Number of chromosomes is halved   |         |         |              |               |                                      |                                 |  |  |                                      |   |  |  |  |   |                               |                                |             |
| Homologous chromosomes line up separately on the metaphase plate | Homologous chromosomes line up in pairs at the metaphase plate  |         |         |              |               |                                      |                                 |  |  |                                      |   |  |  |  |   |                               |                                |             |
| Homologous chromosome do not pair up                             | Homologous chromosome pairup to form bivalent   |         |         |              |               |                                      |                                 |  |  |                                      |   |  |  |  |   |                               |                                |             |
| Chiasmata do not form and crossing over never occurs             | Chiasmata form and crossingover occurs  |         |         |              |               |                                      |                                 |  |  |                                      |   |  |  |  |   |                               |                                |             |
| Daughter cells are genetically identical                         | Daughter cells are genetically different from parent cell   |         |         |              |               |                                      |                                 |  |  |                                      |   |  |  |  |   |                               |                                |             |
| Two daughter cells are formed                                    | Four daughter cells are formed  |         |         |              |               |                                      |                                 |  |  |                                      |   |  |  |  |   |                               |                                |             |
| Q.20   | (a) Dorsiventral leaf- contain well defined dorsal and ventral sides/mesophyll differentiated into palisade and spongy parenchyma<br>Isobilateral leaf- similar in appearance on both the sides/Mesophyll is not differentiated into palisade and spongy parenchyma.<br>(b) A - hypogynous<br>B- Epigynous  | 1<br>1  |         |              |               |                                      |                                 |  |  |                                      |   |  |  |  |   |                               |                                |             |





|             |   |                            |
|-------------|---|----------------------------|
|             | e) Oviparous<br>f) Poikilotherms  |                            |
| <b>Q.26</b> | <p>a) Prosthetic group is a type of a helper molecule which is a non proteinaceous compound that helps enzymes to perform their functions. Coenzyme is a specific kind of cofactor molecule which is an organic molecule that helps enzymes to catalyze chemical reactions.</p> <p>b) At low temperatures, an increase in temperature increases the rate of an enzyme-catalysed reaction. At higher temperatures, the protein is denatured, and the rate of the reaction dramatically decreases. An enzyme has an optimum pH range in which it exhibits maximum activity.</p> | <p>1</p> <p>1</p> <p>1</p> |
| <b>Q.27</b> | <p>When an impulse reaches the end plate of the axon, vesicles consisting of a chemical substance or neurotransmitter, such as acetylcholine, fuse with the plasma membrane. This chemical moves across the cleft and attaches to chemo-receptors present on the membrane of the dendrite of the next neuron. This binding of chemicals with chemo-receptors leads to the depolarization of the membrane and generates a nerve impulse across nerve fibre.</p>                               | <p>1/2×4=2</p> <p>1</p>    |
| <b>Q.28</b> | <p>(a) Axile. b) Valvate C) Epipetalous</p> <p>d) <math>\oplus \text{ } \overline{\text{K}}_{(5)} \text{ } \overline{\text{C}}_{(5)} \text{ } \overline{\text{A}}_5 \text{ } \underline{\text{G}}_{(2)}</math></p>  | <p>1/2+1/2+1+1</p>         |

#### SECTION-D

|             |  |  |
|-------------|--|--|
| <b>Q 29</b> | <p>(a) Medulla oblongata</p> <p>(b) Sympathetic nervous system</p> <ul style="list-style-type: none"> <li>- increased rate of heart beat</li> <li>- increased strength of ventricular contraction and thereby increase in cardiac output.</li> </ul> <p>(c) Adrenal gland</p> <p>(d) -Cardiac output= Volume of blood pumped out by each ventricle per minute</p> <p>-5000 m L or 5 litres.</p>  | <p>1/2</p> <p>1</p> <p>1/2</p> <p>1</p> <p>1</p> |
| <b>Q.30</b> | <p>A. OA represents inspiration and AB represents expiration.</p> <p>B. In phase OA (inspiration), the pressure within the lungs (intra-pulmonary pressure) is less than the atmospheric pressure, and in phase AB (expiration), the pressure within the lungs is slightly above the atmospheric pressure.</p> <p>C. During inspiration, the diaphragm and the external intercostal muscles contract, lifting the ribs and the sternum. This increases the volume of the thoracic chamber and, thereby, the pulmonary volume and leads to a decrease in intrapulmonary pressure.</p> <p>During expiration, the diaphragm and the intercostal muscles relax, which returns the diaphragm and sternum to their normal positions and reduces the thoracic volume, which thereby reduces the pulmonary volume and leads to an increase in intra- pulmonary pressure.</p> | <p>1</p> <p>1</p> <p>1</p> <p>1</p>              |

#### SECTION- E

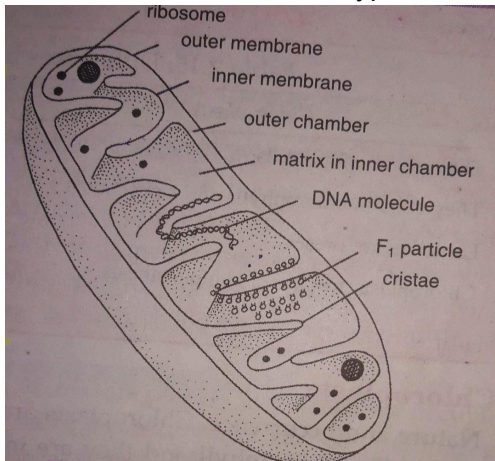
|             |   |   |
|-------------|---|---|
| <b>Q.31</b> | The cardiac cycle comprises all of the physiological events associated with a single heartbeat, including electrical events, mechanical events (pressures and volumes), and heart sounds. | 1 |
|-------------|---|---|



|      |   |  |
|------|---|--|
|      | <p>The cardiac cycle is essentially split into two phases, systole (the contraction phase) and diastole (the relaxation phase). Each of these is then further divided into an atrial and ventricular component.</p> <p>The cardiac cycle therefore proceeds in four stages:</p> <p>Atrial systole: lasts about 0.1 seconds - both atria contract and force the blood from the atria into the ventricles.</p> <p>Ventricular systole: lasts about 0.3 seconds - both ventricles contract, blood is forced to the lungs via the pulmonary trunk, and the rest of the body via the aorta.</p> <p>Atrial diastole: lasting about 0.7 seconds - relaxation of the atria, during which the atria fill with blood from the large veins (the vena cavae).</p> <p>Ventricular diastole: lasts about 0.5 seconds - begins before atrial systole, allowing the ventricles to fill passively with blood from the</p> <p>B) a) <b>goitre</b> is indicated by a <b>swollen neck</b>.<br/> b) Thyroxine<br/> c) iodine<br/> d) Untreated hypothyroidism, especially when it happens during the first trimester, can cause low IQ in a baby. Thyroid problems. This is rare, but it can happen in babies of women with Hashimoto's disease because the antibodies can cross the placenta during pregnancy. Miscarriage or stillbirth.</p>       | <p>1</p> <p>1</p> <p>2</p>   |
| Q 32 | <p>a. Calvin Pathway<br/> C3 - mesophyll cells<br/> C4 - Bundle sheath cells</p> <p>b.</p> <p>The plants and algae turn carbon dioxide from the air into sugar through the process of Calvin cycle. The Calvin cycle is the main source of energy and food for the plants.</p> <p>The Calvin cycle is a light- independent reaction which is a photosynthetic carbon reduction cycle of photosynthesis. It takes place in the stroma outside the thylakoid membrane. It is divided into three main stages:</p> <p>1) Carbon fixation or carboxylation: In this process, the CO<sub>2</sub> is fixed into a stable organic intermediate. The carboxylation of RuBP takes place by the help of CO<sub>2</sub></p> <p>. This reaction is catalysed by the enzyme RuBisCO to form two molecules of 3-PGA.</p> <p>2) Reduction: In the reductive phase, glucose is formed. In this step, 2 molecules of ATP are required for phosphorylation, two NADPH is required for reduction for fixing one CO<sub>2</sub></p> <p>.For generating one molecule of glucose, six CO<sub>2</sub> is required.</p> <p>3) Regeneration: In this step, regeneration of the CO<sub>2</sub> acceptor takes place. It requires one ATP for phosphorylating RuBP. So, for the synthesis of one molecule of glucose, 18 ATP and 12 NADPH are required.</p> | <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>2</p> |
| Q.33 | <p>Mitochondria are called the "powerhouse of cell" as they are involved in the formation of ATP during the aerobic cellular respiration.</p> <p>Their structure shows the following details:</p> <p>They are surrounded by double membranes, as an outer membrane and an inner membrane.</p> <p>The space between the two membranes is called peri-mitochondrial space.</p>  | <p>1/2</p>   |

The inner membrane shows the infoldings called cristae that bear the ATP synthases complex. It has enzymes for the electron transport chain. Interior to the inner membrane, the matrix is present that contains the ribosomes, DNA and enzymes.

The ribosomes are of 70S types and DNA is circular



Any two labelling

B)-A is competitive inhibitor structurally similar to substrate

-competes with substrate for active site

-substrate cannot bind with active site

-enzyme action declines.

**1/2×5  
=2.5**

**1.5**

**1**



**OSDAV Public School, Kaithal**  
**December Examination (2024-25)**  
**Class : XI**  
**Subject : Biology**

**SET-B**

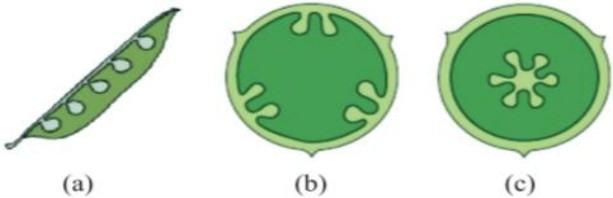
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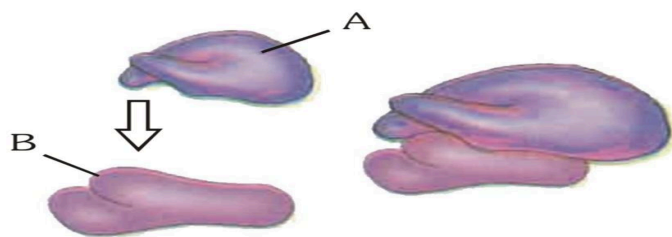
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- (iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
- (v) Wherever necessary, neat and properly labelled diagrams should be drawn.

**SECTION- A**

|     |   |     |                                       |  |           |   |          |   |                       |    |           |    |                              |     |            |     |                                     |    |           |    |                                       |   |           |   |                              |   |
|-----|---|-----|---------------------------------------|--|-----------|---|----------|---|-----------------------|----|-----------|----|------------------------------|-----|------------|-----|-------------------------------------|----|-----------|----|---------------------------------------|---|-----------|---|------------------------------|---|
| Q 1 | To which of the following phylum coral reefs belong?<br>(a) Echinodermata      (b) Platyhelminthes      (c) Cnidaria      (d) Porifera  | 1   |                                       |  |           |   |          |   |                       |    |           |    |                              |     |            |     |                                     |    |           |    |                                       |   |           |   |                              |   |
| Q 2 | Observe the given figure showing various types of placentation. Identify the type of placentation.<br><div></div> <p>A)Marginal, Free central, Axile      B)Axile,Parietal, Marginal<br/>C)Basal,Parietal, Axile      D)Marginal, Parietal, Free central</p>  | 1   |                                       |  |           |   |          |   |                       |    |           |    |                              |     |            |     |                                     |    |           |    |                                       |   |           |   |                              |   |
| Q.3 | Given below are different sub-stages of prophase I. Match them with their correct feature.<br><table border="1" data-bbox="188 1361 1016 1724"><tr><td></td><td>Column I</td><td></td><td>Column II</td></tr><tr><td>I</td><td>Zygotene</td><td>i</td><td>Formation of bivalent</td></tr><tr><td>II</td><td>Pachytene</td><td>ii</td><td>Terminalization of chiasmata</td></tr><tr><td>III</td><td>Diakinesis</td><td>iii</td><td>Dissolution of synaptonemal complex</td></tr><tr><td>IV</td><td>Leptotene</td><td>iv</td><td>Crossing over mediated by recombinase</td></tr><tr><td>V</td><td>Diplotene</td><td>v</td><td>Chromosomes start condensing</td></tr></table> <p>a. I-v, II-i, III-iv, IV-iii, V-ii      b. I-i, II-iii, III-ii, IV-v, V-iv<br/>c. I-i, II-iv, III-ii, IV-v, V-iii      d. I-v, II-iv, III-ii, IV-i, V-iii</p> |     | Column I                              |  | Column II | I | Zygotene | i | Formation of bivalent | II | Pachytene | ii | Terminalization of chiasmata | III | Diakinesis | iii | Dissolution of synaptonemal complex | IV | Leptotene | iv | Crossing over mediated by recombinase | V | Diplotene | v | Chromosomes start condensing | 1 |
|     | Column I  |     | Column II                             |  |           |   |          |   |                       |    |           |    |                              |     |            |     |                                     |    |           |    |                                       |   |           |   |                              |   |
| I   | Zygotene  | i   | Formation of bivalent                 |  |           |   |          |   |                       |    |           |    |                              |     |            |     |                                     |    |           |    |                                       |   |           |   |                              |   |
| II  | Pachytene   | ii  | Terminalization of chiasmata          |  |           |   |          |   |                       |    |           |    |                              |     |            |     |                                     |    |           |    |                                       |   |           |   |                              |   |
| III | Diakinesis  | iii | Dissolution of synaptonemal complex   |  |           |   |          |   |                       |    |           |    |                              |     |            |     |                                     |    |           |    |                                       |   |           |   |                              |   |
| IV  | Leptotene   | iv  | Crossing over mediated by recombinase |  |           |   |          |   |                       |    |           |    |                              |     |            |     |                                     |    |           |    |                                       |   |           |   |                              |   |
| V   | Diplotene   | v   | Chromosomes start condensing          |  |           |   |          |   |                       |    |           |    |                              |     |            |     |                                     |    |           |    |                                       |   |           |   |                              |   |
| Q.4 | Plants having vascular tissues but lacking seeds are :-<br>(A) Bryophyta      (B) Pteridophyta      (C) Gymnosperms      (D) Angiosperms  | 1   |                                       |  |           |   |          |   |                       |    |           |    |                              |     |            |     |                                     |    |           |    |                                       |   |           |   |                              |   |
| Q.5 | Here 'S' (Svedberg's unit) stands for sedimentation coefficient then what are [A] & [B] for eukaryotic cells.<br>A) A – 40S B – 60S      (B) A – 60S B – 40S<br>(C) A – 80S B – 60S      (D) A – 40S B – 80S  | 1   |                                       |  |           |   |          |   |                       |    |           |    |                              |     |            |     |                                     |    |           |    |                                       |   |           |   |                              |   |



**Q.6** A primary root grows from 5 cm to 19 cm in a week. The growth rate and relative growth over the period will be-  
 A) 2cm/day and 80%      B) 4cm/day and 40%      C) 8cm/day and 40%      D) 2cm/day and 40%

**Q.7** The function of our visceral organs is controlled by  
 (a) Sympathetic and somatic neural system      (b) Sympathetic and parasympathetic neural system  
 (c) Central and somatic nervous system      (d) None of the above

**Q.8** The below figure is the diagrammatic representation of standard ECG.

|   | Column I    |     | Column II  |
|---|-------------|-----|--|
| A | P- wave     | I   | Ventricular depolarization followed by ventricular contraction |
| B | QRS Complex | II  | Atrial depolarization followed by systole of both atria        |
| C | T- wave     | III | Ventricular repolarization followed by ventricular relaxation  |

(a) A-I, B-II, C-III      (b) A-III, B -II, C-I      (c) A-II, B – I. C - III      (d) A-II, B-III, C – I

**Q.9** Stele does not include –  
 a) pericycle      b) endodermis      c) pith      d) vascular bundle

**Q.10** In C4 cycle, 1 molecule of glucose is formed from  
 A)  $6\text{CO}_2 + 30\text{ATP} + 12\text{NADPH}_2$   
 B)  $6\text{CO}_2 + 12\text{ATP} + 12\text{NADPH}_2$   
 C)  $6\text{CO}_2 + 18\text{ATP} + 12\text{NADPH}_2$   
 D)  $6\text{CO}_2 + 18\text{ATP} + 30\text{NADPH}_2$

**Q 11** Which one of the following is Ammonotelic animal :-  
 a. Human beings      b. Bony fishes      c. Terrestrial Amphibians      d. Marine Fish

**Q.12** T.O. Diener discovered \_\_\_\_\_.  
 a) Bacteriophage      b) Infectious protein      c) Free infectious DNA      d) Free infectious RNA

**Q.No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:**  
**A. Both A and R are true and R is the correct explanation of A.**  
**B. Both A and R are true and R is not the correct explanation of A.**  
**C. A is true but R is false.**  
**D. A is False but R is true**  
**Q.13** **Assertion :** All enzymes are not proteins.  
**Reason :** RNA molecules that possess catalytic activity are called ribozymes.

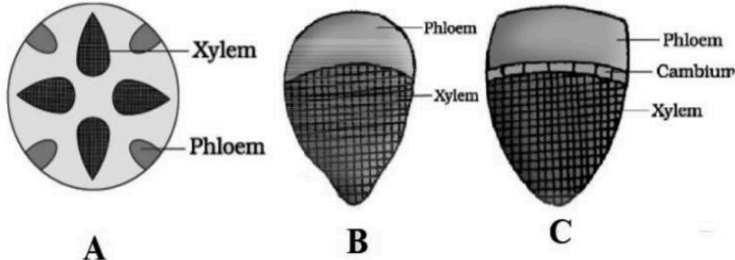
**Q.14** **Assertion:** In Erythroblastosis foetalis mother is Rh-negative and the foetus is Rh-positive.

|             |   |   |
|-------------|---|---|
|             | <b>Reason:</b> In such cases, the mother prepares the antibodies against the Rh antigen   | 1 |
| <b>Q.15</b> | <b>Assertion :</b> In cortical nephrons vasa recta is absent or highly reduced.<br><b>Reason :</b> Cortical nephrons are mainly concerned with the concentration of urine | 1 |
| <b>Q.16</b> | <b>Assertion:</b> Some plants show secondary growth while others do not<br><b>Reason:</b> The vascular bundle having cambium shows secondary growth                       | 1 |

### SECTION-B

| Q.17  | Complete the following table relating the protein with its function  | 2 |         |          |          |                                |         |                |          |         |        |          |
|---|--|---|---------|----------|----------|--------------------------------|---------|----------------|----------|---------|--------|----------|
| <table><tr><th>Protein</th><th>Function</th></tr><tr><td>(a)_____</td><td>Intercellular ground substance</td></tr><tr><td>Trypsin</td><td>_____ (b)_____</td></tr><tr><td>(c)_____</td><td>Hormone</td></tr><tr><td>GLUT-4</td><td>(d)_____</td></tr></table> |  |   | Protein | Function | (a)_____ | Intercellular ground substance | Trypsin | _____ (b)_____ | (c)_____ | Hormone | GLUT-4 | (d)_____ |
| Protein   | Function   |   |         |          |          |                                |         |                |          |         |        |          |
| (a)_____  | Intercellular ground substance   |   |         |          |          |                                |         |                |          |         |        |          |
| Trypsin   | _____ (b)_____   |   |         |          |          |                                |         |                |          |         |        |          |
| (c)_____  | Hormone  |   |         |          |          |                                |         |                |          |         |        |          |
| GLUT-4  | (d)_____   |   |         |          |          |                                |         |                |          |         |        |          |
| Q.18  | Justify giving reasons -<br>(i) GA3 is applied to rice seedlings<br>(ii) A ripe fruit when mixed with unripe fruits hastens fruit ripening   | 2 |         |          |          |                                |         |                |          |         |        |          |
| Q.19  | Differentiate between Spirogyra and Gelidium on the basis of:<br>(i) Pigment composition (ii) Stored food  | 2 |         |          |          |                                |         |                |          |         |        |          |
| Q.20  | Provide the scientific terms for the following :<br>(i) The leaf without a petiole (stalk). (ii) The flat and expanded portion of a leaf.<br>(iii) Orderly arrangement of leaves on the node. (iv) Lateral appendages on either side of the leaf | 2 |         |          |          |                                |         |                |          |         |        |          |
| Q.21  | Explain the mechanism of blood clotting in human being.  | 2 |         |          |          |                                |         |                |          |         |        |          |

### SECTION-C

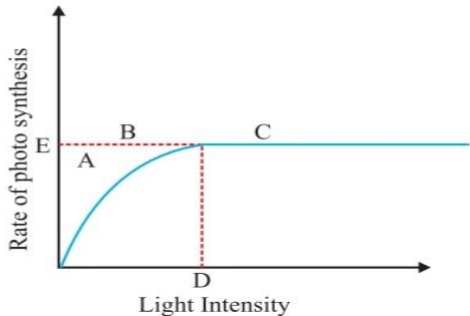
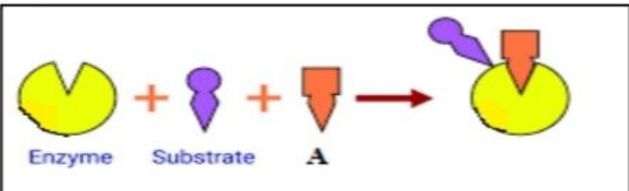
|             |   |   |
|-------------|---|---|
| <b>Q.22</b> | The following figures showing vascular bundles<br> <p style="text-align: center;">A                      B                      C</p> <p>a. Identify the type A, B and C.<br/>b. Name the type of the plant and the plant part in which the above are found.</p> | 3 |
| <b>Q 23</b> | What are the different type of movable joints in humans? Explain any three with example.  | 3 |
| <b>Q 24</b> | Draw the chart of glycolysis and why is it termed as EMP pathway?   | 3 |
| <b>Q.25</b> | A)What is the contribution of the loop of Henle in the making of urine?<br>B)What is the contribution of distal convoluted tubule in the formation of urine ?   | 3 |
| <b>Q.26</b> | Give the scientific term used for the type of chromosome having -<br>(i) Centromere in the middle forming two equal arms of the chromosome<br>(ii) Centromere is situated close to the ends of the chromosome forming one extremely shorter arm   | 3 |

|             |   |          |
|-------------|---|----------|
|             | and one very long arm.<br>(b) What is a mesosome in a prokaryotic cell? State its any two functions.<br>(c) SER is mainly involved in the synthesis of which biomolecule? |          |
| <b>Q.27</b> | How does nerve impulse conduction occur across a synapse? Explain with a diagram.   | <b>3</b> |
| <b>Q.28</b> | Write a floral formula and draw a floral diagram of potato.   | <b>3</b> |

#### SECTION-D

|                                  |   |          |
|----------------------------------|---|----------|
| <b>CASE STUDY BASED QUESTION</b> |   |          |
| <b>Q 29</b>                      | Coelenterates are aquatic, mostly marine organisms exhibiting tissue level of organisation. Their body is characterised by tentacles, stinging cells and horny exoskeleton. They possess well-defined gastrovascular cavity having single opening, polymorphism is one of the major characteristic of coelenterates. In this, the organism exists in different forms<br>A) Name one freshwater Coelenterate.<br>B) The exoskeleton of corals is composed of .....<br>C) Name the special cells present in Coelenterates and their function.<br>D) Name two forms of Coelenterates and differentiate them. | <b>4</b> |
| <b>Q 30</b>                      | The thyroid gland is composed of two lobes which are located on either side of the trachea. Both the lobes are interconnected with a thin flap of connective tissue. The thyroid gland is composed of follicles and stromal tissues. Each thyroid follicle is composed of follicular cells, enclosing a cavity.<br>A) Name a Protein hormone secreted by thyroid gland regulates the blood calcium levels along with PTH.<br>B) How are both lobes of the thyroid gland interconnected?<br>C) What are the adverse effects of iodine deficiency on the human body?  | <b>4</b> |

#### SECTION-E

|             |  |          |
|-------------|--|----------|
| <b>Q.31</b> | Explain the mechanism of muscle contraction by sliding filament theory with the help of a neat and clean diagram.  | <b>5</b> |
| <b>Q.32</b> | A) Describe the process of noncyclic photophosphorylation. Where it takes place in chloroplast.<br>B) The figure shows the effect of light on the rate of photosynthesis. Based on the graph, answer the following questions :<br><br>(i) At which point(s) A, B or C in the curve, light is a limiting factor ?<br>(ii) What could be the limiting factor(s) in region A ?<br>(iii) What do regions C and D represent on the curve ? | <b>5</b> |
| <b>Q.33</b> | A) Describe the structure and function of the control centre of the cell with a well labelled diagram.<br>B) Discuss the effect of A on the rate of the enzyme catalysed reaction depicted below:<br>   | <b>5</b> |







**BIOLOGY-- XI ( Set B)**  
**DECEMBER EXAMINATION(24)**  
**ANSWER KEY AND MARKING SCHEME**  
**SECTION A**

|             |   |          |
|-------------|---|----------|
| <b>Q 1</b>  | C | <b>1</b> |
| <b>Q 2</b>  | D | <b>1</b> |
| <b>Q 3</b>  | C | <b>1</b> |
| <b>Q 4</b>  | B | <b>1</b> |
| <b>Q.5</b>  | B | <b>1</b> |
| <b>Q 6</b>  | D | <b>1</b> |
| <b>Q 7</b>  | B | <b>1</b> |
| <b>Q 8</b>  | C | <b>1</b> |
| <b>Q.9</b>  | B | <b>1</b> |
| <b>Q.10</b> | A | <b>1</b> |
| <b>Q.11</b> | B | <b>1</b> |
| <b>Q.12</b> | D | <b>1</b> |
| <b>Q 13</b> | A | <b>1</b> |
| <b>Q.14</b> | A | <b>1</b> |
| <b>Q.15</b> | C | <b>1</b> |
| <b>Q.16</b> | A | <b>1</b> |

**SECTION-B**

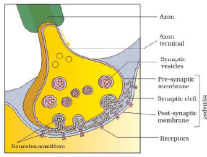
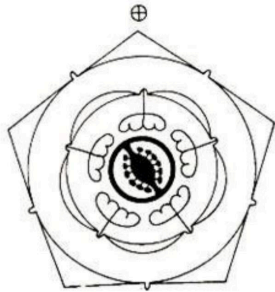
|             |  |  |
|-------------|--|--|
| <b>Q.17</b> | a. Collagen<br>b. Enzyme<br>c. Insulin (or any other protein hormone)<br>d. Enable glucose transport into cells  | $\frac{1}{2}$<br>$\frac{1}{2}$<br>$\frac{1}{2}$<br>$\frac{1}{2}$ |
| <b>Q.18</b> | i) If GA <sub>3</sub> is applied to rice seedlings, then the rice seedlings will exhibit internode-elongation and increase in height.<br>ii) ethylene produced from the ripe fruits will hasten the ripening of the unripe fruits. | <b>1</b><br><b>1</b>   |
| <b>Q.19</b> | Spirogyra- Pigment- chl <sub>a</sub> ,b<br>Stored food- Starch<br>Gelidium- Pigment- phycoerythrin, chl <sub>a</sub> ,d<br>Stored food- Floridean starch   | $\frac{1}{2}+\frac{1}{2}$<br>$\frac{1}{2}+\frac{1}{2}$           |
| <b>Q.20</b> | (i) Sessile<br>(ii) Lamina<br>(iii) Phyllotaxy<br>(iv) Stipules  | $\frac{1}{2}+\frac{1}{2}+$<br>$\frac{1}{2}+\frac{1}{2}$          |

|      |   |  |
|------|---|--|
| Q.21 | <p><b>Blood Clotting : Coagulation of Blood : (Cascade process)</b></p> <pre> graph TD     Stimulus["(Stimulus)→ Injured Tissue"] -- Releases --&gt; Thromboplastins["Thromboplastins<br/>Ca<sup>++</sup> Proteins"]     BloodPlatelets["Blood Platelets"] -- "Disintegrate and release" --&gt; PlateletThromboplastin["Platelet thromboplastin<br/>Ca<sup>+</sup> Proteins"]     Thromboplastins --&gt; Thrombokinase["Thrombokinase"]     PlateletThromboplastin --&gt; Thrombokinase     Thrombokinase -- "Inactivates heparin and catalyses" --&gt; Ca2plus["Ca<sup>++</sup>"]     Prothrombin -- "Ca<sup>++</sup>" --&gt; Thrombin["Thrombin"]     Fibrinogen -- "Ca<sup>++</sup>" --&gt; Fibrin["Fibrin"]     Thrombin -- "Catalyses" --&gt; Fibrin     Fibrin -- "Fibrin + entangled and damaged elements of blood" --&gt; Clot["Clot or Coagulum"]     </pre> | $\frac{1}{2}$<br>$\frac{1}{2}$<br>$\frac{1}{2}$<br>$\frac{1}{2}$ |
|------|---|--|

### SECTION-C

|      |  |  |
|------|--|--|
| Q.22 | <ul style="list-style-type: none"> <li>•A is a radial vascular bundle, present in roots.</li> <li>•B is a conjoint closed vascular bundle, present in monocot stem.</li> <li>•C is conjoint open vascular bundle, present in dicot stem</li> </ul>   | $\frac{1}{2}+\frac{1}{2}+$<br>$\frac{1}{2}+\frac{1}{2}$<br>$\frac{1}{2}+\frac{1}{2}$ |
| Q 23 | <p>Freely movable or synovial joints: In this type of joint, there is a fluid filled synovial cavity in between the movably articulated bones. The fluid is called as synovial fluid. A synovial membrane covers this fluid filled synovial cavity forming the capsule. The articulating bones are provided with cartilage caps. Ligaments are also present to hold the bones. It is of the following types :</p> <ul style="list-style-type: none"> <li>• Ball and socket joint : In this, one of the bones forms a globular head while the other forms a cup like socket into which head fits in. It allows free movement in all directions. E.g.- shoulder girdle and hip girdle joints. Such joints may stretch (extend), fold (flex) and rotate the limb of the body. This may allow the movement of the limb towards the body or away from the body.</li> <li>• Hinge joint : Here, the two bones are fitted like the hinge of a door so as to allow 'to and fro' movements in one direction only. These joints are provided with strong ligaments. It is seen in elbow joint, knee joint and joints between phalanges of fingers and toes.</li> <li>• Pivot joint : In this type of joint, one bone is fixed while the other moves freely over it. The movement is confined to a rotation around a longitudinal axis through the centre of the pivot. E.g.- Movement of the skull over the odontoid processes of the first neck vertebra.</li> </ul> <p><b>Any other also</b></p> | <p>1</p> <p>1</p> <p>1</p>   |

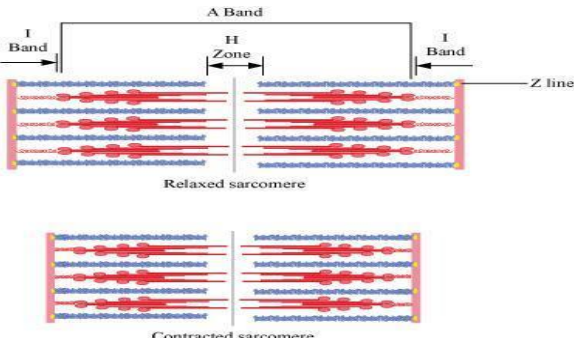
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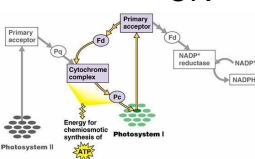
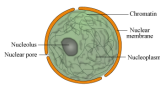
|      |  |            |
|------|--|------------|
|      |    | 1          |
| Q.28 | <p><b>Floral Formula:</b></p> $\text{Ebr } \oplus, \frac{\gamma}{\gamma}, K(5), C(5) \overline{A}_5, G(2)$  | 1<br><br>2 |

#### SECTION-D

|      |   |  |
|------|---|--|
| Q.29 | <p>A)Hydra<br/>B) Calcium carbonate<br/>C)Nematocysts, offence and defence and food gathering<br/>D)Polyp and Medusa</p> <p>The difference between polyp and medusa is that polyp is a fixed, cylindrical structure that symbolizes the asexual stage. Medusa is a free-swimming, umbrella-like structure representing the sexual stage.</p>  | $\frac{1}{2}$<br>$\frac{1}{2}$<br>1<br><br>2 |
| Q.30 | <p>A)Thyrocalcitonin<br/>B)Thyroid gland is composed of two lobes; these lobes are interconnected with a thin flap of connective tissue called isthmus.<br/>C)Iodine is essential for the optimum level of thyroid hormone secretion. Deficiency of iodine in our diet results in hypothyroidism and enlargement of the thyroid gland, commonly known as goitre. Deficiency of iodine during pregnancy causes defective development and maturation of the growing baby leading to stunted growth (cretinism), mental retardation, low intelligence quotient, abnormal skin, deaf-mutism, etc. In adult women, deficiency of iodine may cause the menstrual cycle to become irregular.</p> | 1<br><br>1<br><br>2                          |

#### SECTION- E

|      |   |   |
|------|---|---|
| Q.31 | <p>The sliding filament theory explains the process of muscle contraction during which the thin filaments slide over the thick filaments, which shortens the myofibril.</p> <p>During muscle contraction, the myosin heads or cross bridges come in close contact with the thin filaments. As a result, the thin filaments are pulled towards the middle of the sarcomere. The Z line attached to the actin filaments is also pulled leading to the shortening of the sarcomere. Hence, the length of the A band remains constant as its original length and the I-band shortens and the H-zone disappears.</p>  | $\frac{1}{2} \times 6 = 3$<br><br><br><br><br><br><br><br><br><br>2 |
|------|---|---|

|             |   |   |
|-------------|---|---|
|             |   |   |
| <b>Q 32</b> | <p>A)The photophosphorylation process which results in the movement of the electrons in a non-cyclic manner for synthesising ATP molecules using the energy from excited electrons provided by photosystem II is called non-cyclic photophosphorylation.</p> <p>This process is referred to as non- cyclic photophosphorylation because the lost electrons by P680 of Photosystem II are occupied by P700 of Photosystem I and are not reverted to P680. Here the complete movement of the electrons is in a unidirectional or in a non- cyclic manner.</p> <p>During non-cyclic photophosphorylation, the electrons released by P700 are carried by the primary acceptor and are finally passed on to NADP. Here, the electrons combine with the protons – H<sup>+</sup> which is produced by splitting up of the water molecule and reduces NADP to NADPH<sub>2</sub>.</p> <p style="text-align: center;">OR</p>  <p>In the thylakoid membrane of chloroplast</p> <p>B)(i) 'B'</p> <p>(ii) CO<sub>2</sub> and temperature</p> <p>(iii) 'C' represents to constant rate of photosynthesis, 'D' is the light saturation intensify at which rate of photosynthesis is maximum.</p>  | <p><b>2.5</b></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><b>1</b></p> |
| <b>Q.33</b> | <p>Nucleus is considered as the director or controller of the cell because it controls all the activities of the cell through its DNA molecule. The various structural components of nucleus are:</p> <p>Nuclear membrane: Nucleus is a double membrane-bound organelle. The nuclear envelope consists of two membranes; an outer membrane and an inner membrane that are separated by perinuclear space. The nuclear membrane is perforated by apertures which are called nuclear pores.</p> <p>Nucleoplasm: It is interior fluid just like the cytoplasm, which is enclosed by the nuclear membrane.</p> <p>Nucleolus: The spherical body within the nucleus is placed centrally or peripherally in close association with the nucleolar organiser region of chromosomes. It is the site of RNA synthesis.</p> <p>Chromatin: The organisation of DNA and proteins inside the nucleus.</p> <p>When the cell prepares to divide, the chromatin condenses and becomes thick to form specialised structures called chromosomes.</p>  <p style="text-align: center;">Any two labelling</p> <p>B)-A is competitive inhibitor structurally similar to substrate</p> <ul style="list-style-type: none"> <li>-competes with substrate for active site</li> <li>-substrate cannot bind with active site</li> <li>-enzyme action declines.</li> </ul> | <p><math>\frac{1}{2}</math></p> <p><b>1/2×5<br/>=2.5</b></p> <p><b>1.5</b></p> <p><b>1</b></p>                                    |