



## ST. JOSEPH'S COLLEGE, PRAYAGRAJ

HALF YEARLY EXAMINATION 2024

**BIOLOGY**

**CLASS – X**

**TIME: 2 Hours**

**MM: 80**

Answers to this Paper must be written on the paper provided separately. You will not be allowed to write during the first 15 minutes. This time is to be spent reading the question paper. The time given at the head of this Paper is the time allowed for writing the answers. **Section A is compulsory.** Attempt any four questions from **Section B.** The intended marks for questions or parts of questions are given in brackets [ ]

### SECTION A – 40 Marks

(Attempt all questions from this Section)

**Q 1) Select the correct answers to the questions from the given option.**

**[15]**

- During telophase, the  
(a) Nuclear membrane is formed (b) Nucleolus appears (c) Astral rays disappear (d) All of these
- Replication of DNA in the cell cycle occurs during the:  
(a) G<sub>1</sub>- phase (b) Anaphase (c) S- phase (d) G<sub>2</sub>- phase
- When an individual has both the genes of a contrasting character, it is said to be:  
(a) Homozygous (b) Heterozygous (c) Phenotype (d) Genotype
- Deplasmolysis occurs when a plasmolysed cell is placed in  
(a) Concentrated salt solution (b) Tap water (c) Concentrated sugar solution (d) Hypertonic salt solution
- The process in which water is lost from the margins of strawberry leaves is:  
(a) Osmosis (b) Imbibition (c) Diffusion (d) Guttation
- The process of conversion of ADP to ATP during photosynthesis:  
(a) Polymerization (b) Photophosphorylation (c) Photorespiration (d) Photolysis
- The individual flattened stacks of membranous structures inside the chloroplasts are known as:  
(a) Grana (b) Stroma (c) Thylakoids (d) Cristae
- Which hormone functions as a growth promotor?  
(a) Auxin (b) Ethylene (c) Abscisic acid (d) Both (b) and (c)
- The instrument which can be used to demonstrate geotropism:  
(a) Manometer (b) Thermostat (c) Clinostat (d) Barometer
- The loop of Henle lies in  
(a) Renal cortex (b) Renal medulla (c) Renal pelvis (d) Renal artery
- During ventricular systole, the atrioventricular valves (P) ----- and semilunar valves (Q) -----.  
(a) P- close, Q – open (b) P – close, Q- close (c) P- open, Q- close (d) P-open, Q- open
- Assertion (A):** We urinate more in summer.  
**Reason (R):** Sweat glands are more active in summer.  
(a) A is True and R is False (b) A is false and R is True (c) Both A and R are True (d) Both A and R are False
- A sequence of DNA has 200 nitrogenous base pair, of which 100 are Thymine – Adenine pairs. What is the number of Cytosine – Guanine pairs in this sequence:  
(a) 50 (b) 200 (c) 100 (d) 25
- Assertion (A):** Thrombin converts fibrinogen into fibrin.  
**Reason (R):** Calcium ions are necessary for thrombin to function.  
(a) A is True and R is False (b) A is false and R is True (c) Both A and R are True (d) Both A and R are False
- Monohybrid phenotypic ratio is:  
(a) 9:3:3:1 (b) 3:1 (c) 1:2:1 (d) 2:3

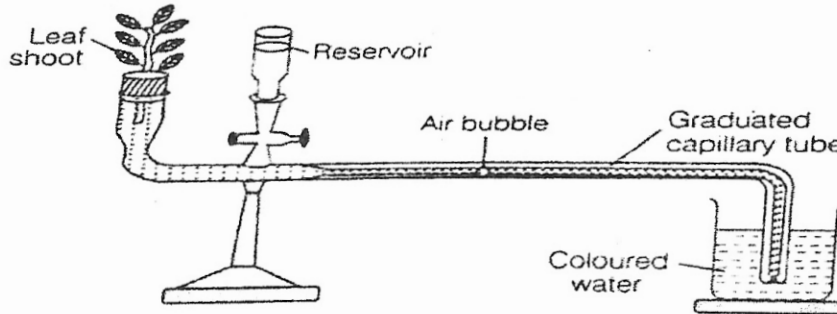
**Q 2) 1. Name the following:**

**[5]**

- Sudden change in the structure and number of chromosomes.
- Special pores in some leaves through which guttation occurs.
- Plant hormone that is gaseous in nature.

- d. Small differences seen between parents and their children.
- e. Solution having higher solute concentration.

2. Given below is an experimental set to determine certain aspect of the plant. Study the passage given below and fill the blanks with the appropriate terms or statements. [5]



Name of the apparatus is a. The aim of the setup is to measure the b. One of the limitations of this apparatus is that the c does not remain alive for a long period. Introducing a d in the capillary tube is not easy. Transpiration is the e loss of water from the aerial parts of the plant.

3. Arrange the following in a logical sequence beginning with the underlined term: [5]

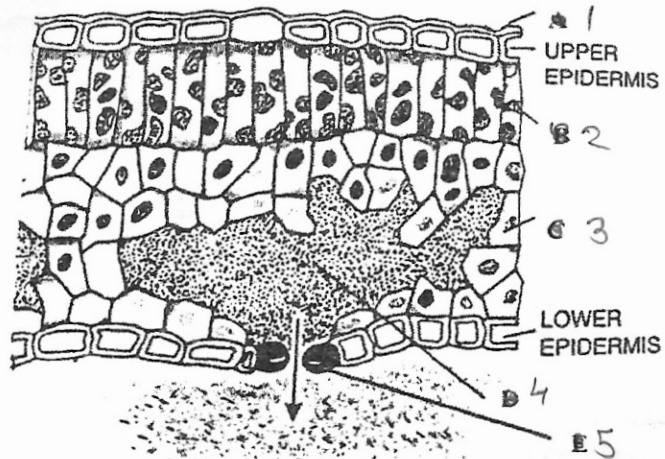
- a) Karyokinesis, G<sub>2</sub> phase, Cytokinesis, 'S'- phase
- b) Bowman's capsule, Collecting duct, PCT, DCT,
- c) Xylem, Soil water, Cortical cells, Root hair
- d) Thromboplastin, Fibrin, Platelets, Fibrinogen
- e) Cytoplasm, Cell wall, Nucleus, Plasma membrane

4. State the exact role of the following: [5]

- a) ~~Chordae tendinae~~ *white blood cells*
- b) Sino-atrial node
- c) Ribosomes
- d) Thylakoids
- e) Phloem tissue

5. Given below is the vertical section of a dicot leaf. Label the structures marked as A, B, C, D and E and then match them with the most suited statements given below marked from 1 to 5. [5]

- a) Have large intercellular spaces.
- b) Has a waxy coating.
- c) Can become turgid and flaccid.
- d) Has a high concentration of chloroplast.
- e) It's escaping results in cooling of plants

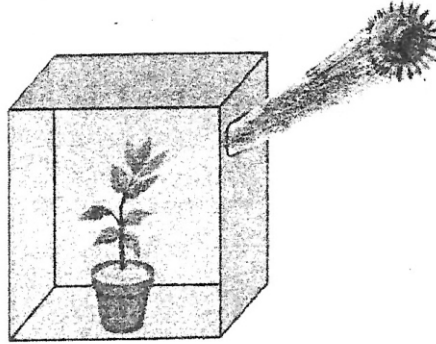


## SECTION B – 40 Marks

(Attempt any four questions from this section)

Q 3)

1. Expand the abbreviation –NADP. [1]
2. State Mendel's law of dominance. [2]
3. State any two adaptations in plant to reduce excessive transpiration. [2]
4. Give two points of difference between mitosis in animal cell and mitosis in plant cell. [2]
5. Study the diagram given below and answer the questions that follow: [3]



- a) Name the phenomenon depicted by the shoot in the above diagram.
- b) Which plant hormone plays an important role in the above movement?
- c) Complete and rewrite the given statement by filling in the correct terms:  
Shoots show positive ----- whereas, roots show positive -----.

Q 4)

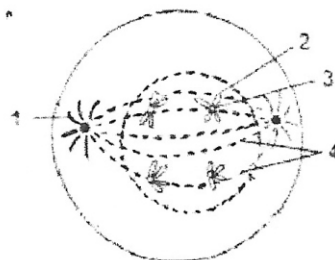
1. What is micturition? [1]
2. Wooden doors and windows are difficult to open or close during the rainy season. [2]  
Give the reason for the following statement.
3. Differentiate between photophosphorylation and photolysis. [2]
4. Differentiate between heterozygous and homozygous condition. [2]
5. Given below is a cross between garden pea plants, where - r= wrinkled seeds, [3]  
R = round seeds, T= tall plant and t = dwarf plant.

R r T t                      X                      R r T t

- a) Draw a punnet square to show the genotype of the above cross.
- b) Write the phenotypic ratio of the above obtained generation.

Q 5)

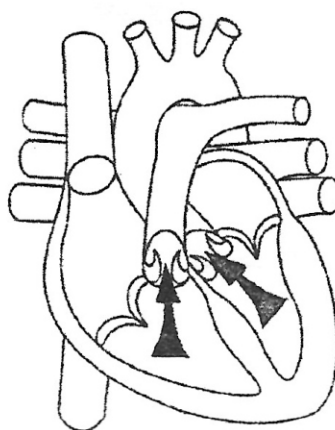
1. Define genotype. [1]
2. What is sex linked inheritance? Give example. [2]
3. A pure breeding red flower variety of pea plant (RR) is crossed with a pure breeding white flower variety of pea plant (rr). [2]  
Draw a Punnett square to find out the Phenotype and Genotypic ratios of the progeny belonging to the F<sub>2</sub> generation. [2]
4. Write the main steps in coagulation of blood in their correct sequence. [2]
5. Given below is a diagram representing a stage during mitotic cell division in an animal cell. Examine it carefully and answer the questions which follows [3]



- a) Identify the stage. Give one reason in support of your answer.
- b) Name the parts labelled as 1,2,3 and 4.
- c) Name the stage that follows the one shown here. How is that stage identified?

Q 6)

1. Define the term Apical dominance. [1]
2. Write full forms of the following abbreviations: [2]  
(a) PCT: ----- (b) DCT: ----- (c) ADH: ----- d) ORS: -----.
3. Why the left ventricle of the heart has a thicker wall than the right ventricle? [2]
4. What are Chordae tendinae? State its function. [2]
5. The diagram below depicts the human heart in one of its phases. [3]



Answer the question that follow:

- a) Which part of the heart is in the contraction phase?
- b) Give a suitable reason to justify your answer in (a).
- c) Distinguish between systole and diastole.

Q7.

1. Write the balanced chemical reaction of photosynthesis. [1]
2. Explain the effect of the following on the rate of transpiration. Give proper reason. [2]  
a) Humidity            b) Breezy day
3. You are provided with a potted plant and cobalt chloride paper. Explain how would you utilize them and what would be your aim? [2]
4. Explain tubular secretion in the kidneys. [2]
5. Answer the following questions: [3]  
a) Arteries are more muscular and thicker than the veins. Justify the statement.  
b) Name the solvent required to remove chlorophyll from a green leaf.  
c) What is ADH? Explain the disease if it is secreted insufficiently.