THE FIRST COMPARATIVE EXAMINATION 2021-22

Class X (ICSE)

BIOLOGY

SCIENCE Paper - 3

Time: Two hours **Maximum marks: 80**

Instructions:

- *Answers to this paper must be written on the answer script provided separately.*
- *You will **NOT** be allowed to write during the first **15** minutes. This time is to be spent in reading the question paper.*
- *The time given at the head of this paper is the time allowed for writing the answers.*
- *The intended marks for questions or parts of questions are given in brackets [ ].*
- *Please **do not** write anything on your question paper except your name and roll number.*
- *All subsections of each question must be answered in the correct order.*
- *Do not copy the questions on your answer script. Copy the correct question number.*
- *This question paper consists of **two** sections. **Section I** contains **one** question with **eight parts (a) to (h)**. All the parts are **compulsory**. **Section II** contains **six** questions **numbered 2 to 7**. You have to answer any **four** of these questions.*

SECTION I [40 marks]

*Attempt **all** questions from this Section.*

Question 1

(a) Name the following:

(i) A kind of cell division seen at the tip of the shoot

(ii) The process of conversion of ADP into ATP during photosynthesis

(iii) The phase of cell cycle in which DNA is synthesized

(iv) The repeated unit present on DNA strand

(v) The mineral element present in chlorophyll.

(b) State *location* of each of the following:

(i) Cell wall –

(ii) Thylakoid

(iii) Centrosome

(iv) Chloroplast

(v) Genes.

(c) **Copy and Complete** the following paragraph by filling in the blanks (1) to (5) with appropriate term/words: [5]

To test a leaf for starch, the leaf is boiled in water to ..... It is then boiled in methylated spirit to ..... (2) ..... The leaf is dipped in warm water to soften it. It is placed in petridish and ..... (3) ..... solution is added. The region of the leaf which contains starch turns ..... (4) ..... and the region which does not contain starch turns ..... (5) .....

(d) Given below are sets of five terms each. Rewrite them in correct logical sequence:

(i) photons, water molecules, oxygen, grana, Hydrogen and hydroxyl ions

(ii) metaphase, telophase, prophase, anaphase, interphase

(iii) histone, DNA strand, chromosome, nucleosome, chromatin fibres

(iv) soil water, root hair, xylem, cortex, endodermis

(v) G2 phase, G1 phase, synthesis phase, karyokinesis, cytokinesis.

(e) Choose the correct answer from each of the four options given below: [5]

(i) The number of daughter cells formed at the end of meiosis from a cell:

(A) 2 Haploid cells (B) 2 Diploid cells

(C) 4 Haploid cells (D) 4 Diploid cells.

(ii) Plasmolysis identifies the process of:

(A) Imbibition (B) Diffusion

(C) Active transport (D) Osmosis.

(iii) Nuclear membrane reappears during:

(A) Metaphase (B) Telophase

(C) Anaphase (D) Prophase.

(iv) A destarched plant is the one whose:

(A) Leaves are free from chlorophyll

(B) Aerial parts are free from starch

(C) Leaves are free from starch

(D) Plant is free from starch.

(v) A plant cell may burst when:

(A) Turgor pressure exceeds wall pressure

(B) Wall pressure exceeds turgor pressure

(C) Turgor pressure equalizes wall pressure

(D) None of these.

(f) State whether the following statements are true or false. Rewrite the correct statement by changing the first or last word(s) of the statement. [5]

(i) The solvent used to dissolve chlorophyll pigments while testing a leaf for starch is soda lime alcohol

(ii) The nitrogen bond joins the complementary nitrogenous bases hydrogen

(iii) Movement of molecules from their lower concentration to their higher concentration with the expense of energy is called active transport cell membrane

(iv) The cell wall is semi permeable.

(v) Karyokinesis is division of cytoplasm. nucleus

(g) Define each of the following terms: [5]

(i) Tonicity -

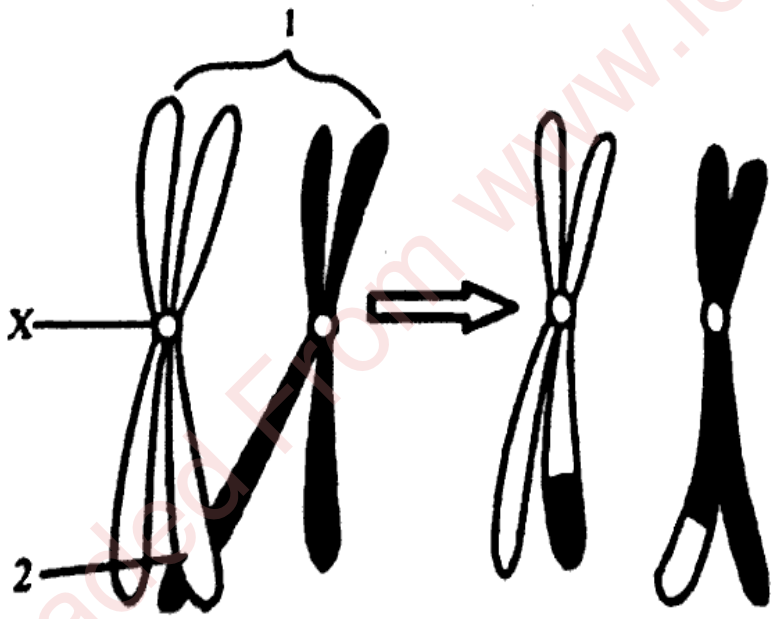
(ii) Root pressure -

(iii) Imbibition -

(iv) Nucleosome -

(v) Photosynthesis.

(h) Study the diagram given below and answer the questions that follow:



(i) Name and define the phenomenon shown in the diagram. - Crossing over [1½]

(ii) Give the significance of the phenomenon named in part (i) above. Variation [1] Evolution

(iii) Name the parts labelled 1 and 2. - Chiasma Centromere [1]

(iv) Name the part labelled X and state its function. Centromere [1]

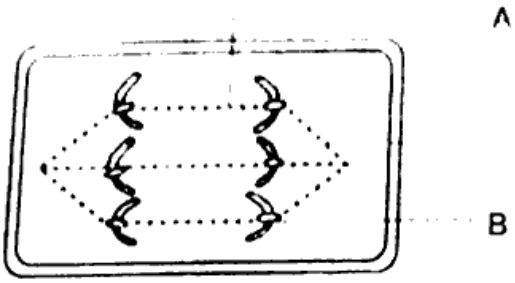
(v) In which type of cell division does this phenomenon occurs? [½]
Meiosis

SECTION II [40 marks]

*Attempt **any four** questions from this Section*

Question 2

(a) Study the diagram given below and answer the questions that follow



(i) Identify the cell and state one reason to justify it. [1½]

(ii) Name the stage/phase depicted in the diagram. What unique feature is observed in this stage? [1½]

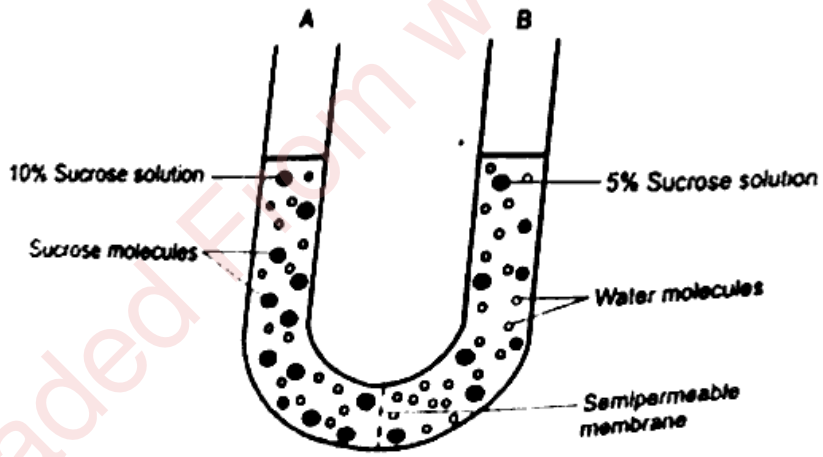
(iii) Name and draw the stage that comes before the stage shown in the diagram. [2]

(b) State the significant function of each of the following: [5]

(i) Root hair
(ii) Chromosomes
(iii) Chlorophyll
(iv) Stomata
(v) Phloem.

Question 3

(a) Given below is the diagram of an experiment just at the start. Study the diagra. given below and answers the questions that follow:



(i) Define the phenomenon shown. [1]

(ii) Which limb of the U tube contain more concentrated sucrose solution A or B? [½]

(iii) Why the two kinds of molecules have been shown in different sizes? [1]

(iv) Why is the membrane separating the two solutions labelled as semi-permeable membrane? [1]

(v) Which limb of the U tube A or B is functionally comparable to the root hair of a plant? [1]

(vi) What will be your observation after few hours? [½]

(b) Give suitable reason for each of the following statements [5]

(i) Cell division is a must for all living organisms

(ii) Meiosis is said to be reduction division.

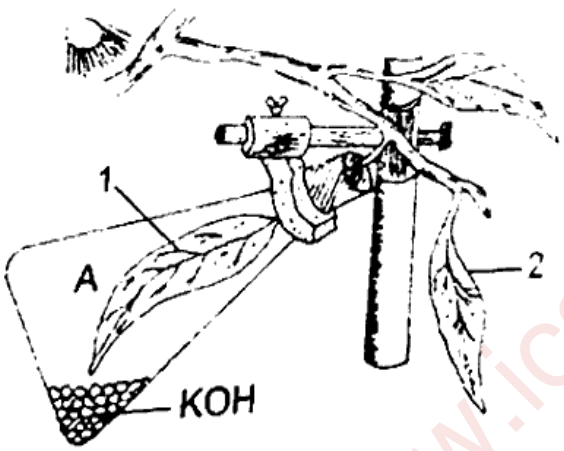
(iii) Plants begin to die when excess of fertilizer is added to the soil.

(iv) A tiger owes its existence to chlorophyll.

(v) Plants with thin and broad green leaves perform more photosynthesis.

Question 4

(a) Study the following experimental setup demonstrating a particular aspect of a biological process and answer the questions that follow:



(i) What is the aim of the experiment? [1]

(ii) Give a balanced chemical equation to represent the process shown in the setup. [1]

(iii) What chemical can be used as an alternative of KOH? [½]

(iv) In what manner do the leaves 1 and 2 differ at the end of starch test? [1]

(v) Draw a neat labelled diagram of a chloroplast. [1½]

(b) Differentiate between each of the following pairs on the basis of the parameters given in the brackets: [5]

(i) Haploid and Diploid (Definition)

(ii) Turgor pressure and Wall pressure (Explanation)

(iii) Exosmosis and Endosmosis (State of cell)

(iv) Mitosis and Meiosis (Number of nuclear division)

(v) Stroma and Grana (Function).

Question 5

(a) Give the appropriate term for each of the following: [5]

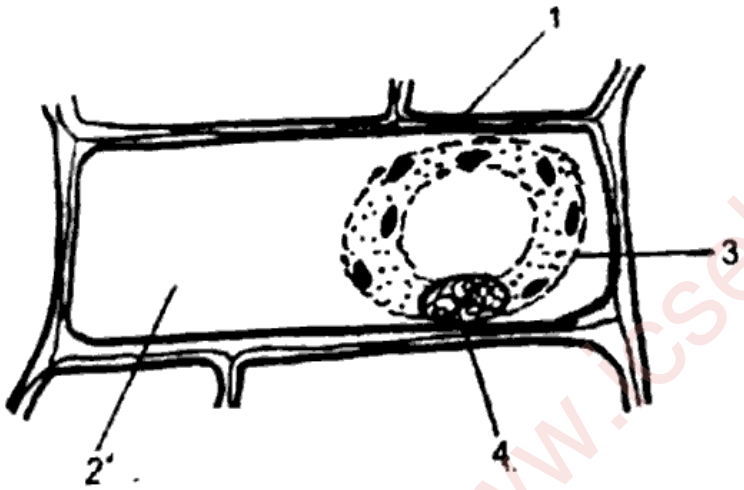
(i) Phase of cell cycle in which RNA and proteins are synthesized.

(ii) The protein constituent of the chromatin material.

(iii) An instrument used to measure the root pressure.

(iv) The process of conversion of glucose to starch in photosynthesis
(v) Loss of water in the form of droplets from the margin of leaves.
(vi) Fully distended state of the cell.
(vii) Specific sequence of nucleotide on a chromosome.
(viii) Radiating rays coming from centrioles in animal cell.
(ix) Type of solution in which cell shape and size remains unchanged.
(x) The process by which molecule distribute themselves evenly within the space they occupy.

(b) Given below is the diagram of a cell as seen under microscope after been placed in a solution. Study the diagram and answer the questions that follow:

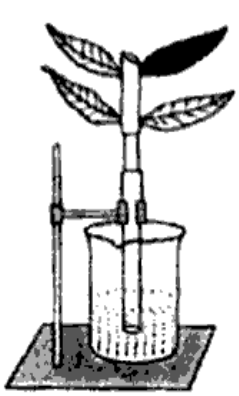


(i) What is the technical term used for state/condition of the cell given? [½]
(ii) Give the technical term of the solution in which cell was placed. hypertonic [½]
(iii) Name the parts numbered 1 to 4. [2]
(iv) Is the cell plant cell or animal cell? Give two reasons in support of your answer as evident from the diagram. [1½]
(v) What would you do to bring the cell back to its original condition? [½]

Question 6

(a) Study the experiment setup given below and answer the questions given alongside:

(i) What is the aim of the experiment? [1]
(ii) Name the conducting tissue in shoot A and shoot B that has been removed. [1]
(iii) Give reasons for your observations in the diagrams A and B given. [1]
(iv) Draw a neat labelled diagram of stomatal apparatus. [2]


A


B

(b) Expand the following abbreviations:

(i) NADP [1]

(ii) ATP [1]

(iii) DNA. [1]

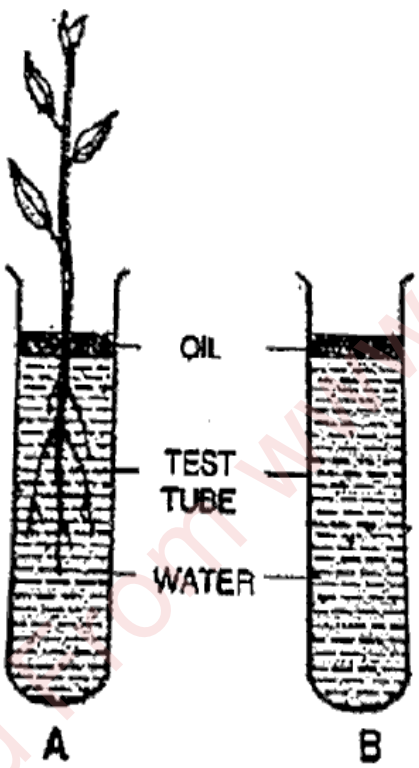
(c) Give an example of:

(i) Plant with variegated leaf [1]

(ii) Aquatic plant used in the experimental setup of photosynthesis. [1]

Question 7

(a) Study the experimental setup given below and answer the questions that follow:



(i) What is the aim of the setup? [1]

(ii) What will be observed in the two test tubes after 2 - 3 days? [1]

(iii) Why is the surface of water covered with oil? [1]

(iv) State the purpose of setting up test tube B. [1]

(b) Give the diagrammatic representation of carbon cycle. [3]

(c) Choose the odd one out and mention the category of the remaining terms. [3]

(i) Stoma, Stroma, Grana, Thylakoid

(ii) Nitrogenous base, Pentose sugar, Sulphate, Phosphate

(iii) Cell wall, Centrosome, Cell membrane, Chloroplast