CLASS IX – SCIENCE PRACTICE PAPER (2026-27)

Chapter 2: Cell – The Building Block of Life

Max. Marks: 40 **Time Allowed: 1 hour 30 minutes**

General Instructions:

(i) This question paper consists of **20 questions** in **5 sections (A to E)**. All questions are compulsory. Internal choice is given in some questions.

(ii) **Section A** has 10 questions of 1 mark each: Q1–8 are Multiple Choice Questions and Q9–10 are Assertion–Reason questions.

(iii) **Section B** has 4 Very Short Answer questions of 2 marks each (about 30–40 words).

(iv) **Section C** has 3 Short Answer questions of 3 marks each (about 50–60 words).

(v) **Section D** has 2 Case-Based questions of 4 marks each.

(vi) **Section E** has 1 Long Answer question of 5 marks with an internal choice.

(vii) Questions are competency-based and application-oriented. Show all steps in numerical and estimation questions.

(viii) **Questions 2, 6, 12, 16, 19 and 20 are figure-based** and refer to Fig. 1 to Fig. 6.

SECTION A – Objective Questions (10 × 1 = 10 marks)

1 Which of the following statements is **not** a part of the classical Cell Theory? **1**

(A) All living organisms are made up of one or more cells.

(B) The cell is the basic unit of structure and function in living beings.

(C) All cells arise from pre-existing cells.

(D) Every cell has a well-defined nucleus.

2 **[Figure-based]** Fig. 1 shows a light microscope with some parts labelled P, Q, R, S and T. A student places a slide of onion peel on the microscope and finally sharpens the image. The slide is placed on the part labelled ____ and the final sharp focus is obtained using the part labelled ____. **1**

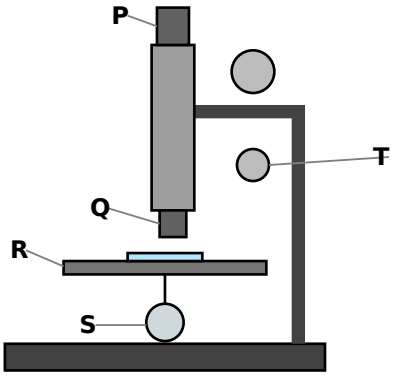


Fig. 1: A light microscope

(A) Q and S

(B) R and T

(C) S and P

(D) T and Q

3 Which of the following correctly describes a **prokaryotic** cell? **1**

(A) It has a membrane-bound nucleus and many membrane-bound organelles.

(B) Its genetic material lies in a nucleoid and it lacks membrane-bound organelles.

(C) Its typical diameter is 10–100 µm and it is always multicellular.

(D) It has DNA but no ribosomes.

4 The inner membrane of a mitochondrion is folded into finger-like projections called cristae. This helps the cell because cristae: **1**

(A) store water and minerals for the cell
(B) increase the surface area for chemical reactions and energy production
(C) synthesise proteins on their surface
(D) absorb sunlight for making food

5 While estimating the size of an onion peel cell, a student finds that the diameter of the field of view is 3 mm and that 15 cells lie in a straight line along this diameter. The estimated size of one cell is: **1**

(A) 20 µm
(B) 45 µm
(C) 200 µm
(D) 2000 µm

6 **[Figure-based]** Fig. 2 shows the same animal cell kept for an hour in three different solutions P, Q and R. In which solution(s) is the solute concentration **outside** the cell higher than inside it? **1**

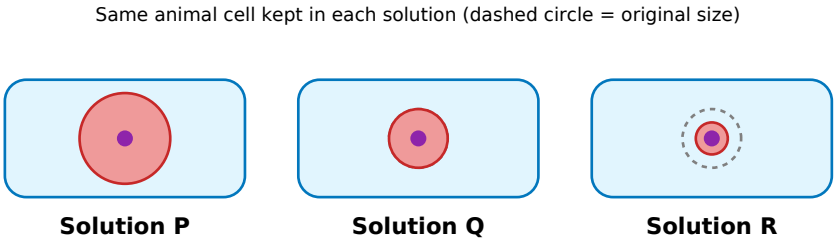


Fig. 2: Effect of three solutions on an animal cell

(A) P only
(B) Q only
(C) R only
(D) P and R

7 When a *Rhoeo* leaf peel is kept in a concentrated sugar solution, its cells lose water but do not change their overall shape. This is because of the: **1**

(A) cell membrane
(B) cell wall
(C) large central vacuole
(D) nucleus

8 Which pair of cell organelles contains their own DNA and ribosomes, like bacteria? **1**

(A) Golgi apparatus and lysosomes
(B) Mitochondria and plastids
(C) Endoplasmic reticulum and ribosomes
(D) Vacuoles and lysosomes

Questions 9 and 10 consist of two statements: Assertion (A) and Reason (R). Choose the correct option:
(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.

9 **Assertion (A):** Mature human red blood cells survive for only about 120 days. **1**

Reason (R): Mature red blood cells do not have a nucleus, so they cannot repair or divide themselves.

10 **Assertion (A):** Mitosis produces two daughter cells that are genetically identical to the parent cell. **1**

Reason (R): In mitosis, each daughter cell receives half the number of chromosomes of the parent cell.

SECTION B – Very Short Answer Questions (4 × 2 = 8 marks)

11 Differentiate between **osmosis** and **diffusion** on any two points. (1 + 1) **2**

12 **[Figure-based]** Two equal-sized pieces of potato were weighed and kept in two beakers, as shown in Fig. 3. After one hour they were weighed again. **2**

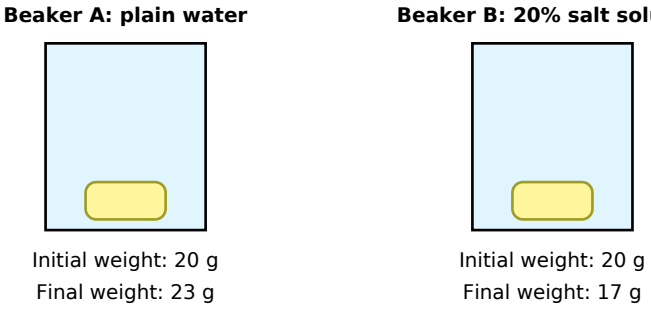


Fig. 3: Potato pieces in plain water and in 20 per cent salt solution

(a) Name the process responsible for the change in weight in Beaker A and state the direction of water movement. (1)

(b) Calculate the percentage change in weight of the potato piece in Beaker B and explain why it occurred. (1)

13 Name the cell organelle that is called (a) the "protein factory" and (b) the "packaging and shipping centre" of the cell. Write one function of each. (1 + 1) **2**

14 *Attempt either option A or B.* **2**

A. Mature human red blood cells lack a nucleus. State one advantage and one disadvantage of this for the cell. (1 + 1)

OR

B. Name two types of plastids that do **not** contain chlorophyll and write one function of each. (1 + 1)

SECTION C – Short Answer Questions (3 × 3 = 9 marks)

15 Write any **three** differences between prokaryotic cells and eukaryotic cells. (1 + 1 + 1) **3**

16 **[Figure-based]** Fig. 4 shows a plant cell with some structures labelled P, Q, R, S and T. **3**

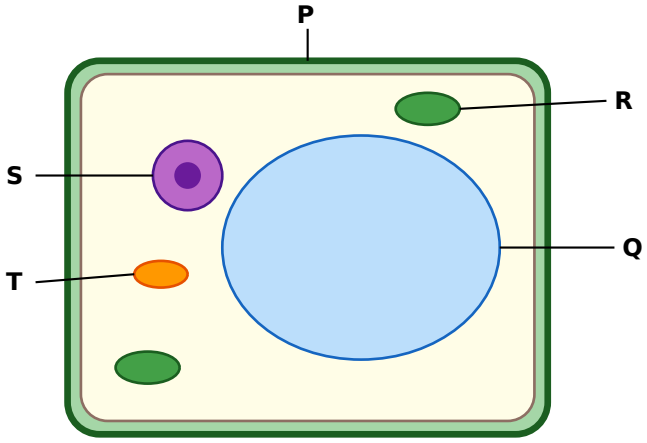


Fig. 4: A typical plant cell

(i) Identify the structures P, Q and R. (1)

(ii) S is the organelle that controls the activities of the cell and T is the site of cellular respiration. Name S and T. (1)

(iii) Name any two structures visible in Fig. 4 that are **absent** in an animal cell. (1)

17 *Attempt either option A or B.* **3**

A. Mitochondria are called the "powerhouses of the cell". Describe how the structure of a mitochondrion helps it to supply energy to the cell. (3)

OR

B. Why does a plant look wilted when it does not get enough water? Explain the role of the vacuole in this. (3)

SECTION D – Case-Based Questions (2 × 4 = 8 marks)

18 **Case Study: Can DNA Run a Cell?** **4**

In 2010, a team of scientists worked out the complete DNA sequence of a simple bacterium, *Mycoplasma mycoides*, and then chemically made an exact copy of this DNA in the laboratory. They took a closely related bacterium, removed its own DNA but kept its cytoplasm and cell membrane intact, and inserted the laboratory-made DNA into it. The cell then began to grow and divide, following the instructions of the new DNA. However, the scientists did not make a completely new cell from scratch.

(i) What was synthesised in the laboratory in this experiment? (1)

(ii) What does this experiment show about the role of DNA in a cell? (1)

(iii) Did scientists create an entirely new cell? Justify your answer. (1)

(iv) The bacterial cell has no well-defined nucleus. Name the region where its genetic material is present. (1)

19 Case Study: Estimating the Size of a Cell **4**

[Figure-based] A student wants to estimate the size of an onion peel cell using a light microscope. She measures the diameter of the circular field of view with a transparent millimetre ruler and finds it to be 2.4 mm. Fig. 5 shows the cells seen in the field of view. The eyepiece lens is 10X and the objective lens is 40X.

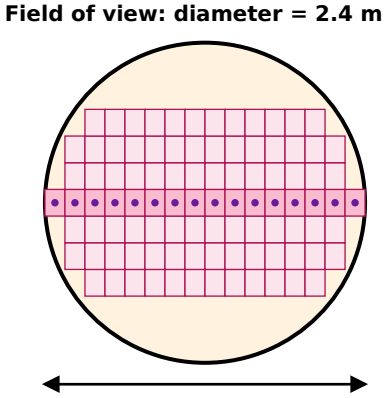


Fig. 5: Onion peel cells in the field of view of a microscope

(i) Convert the diameter of the field of view into micrometres (µm). (1)

(ii) Estimate the size of one onion peel cell using Fig. 5. (1)

(iii) Find the total magnification of the microscope. (1)

(iv) How large would one cell appear under this magnification? Give your answer in millimetres. (1)

SECTION E – Long Answer Question (1 × 5 = 5 marks)

20 **[Figure-based]** Fig. 6 shows two types of cell division, X and Y, in an animal cell that has 4 chromosomes. **5**

Attempt either option A or B.

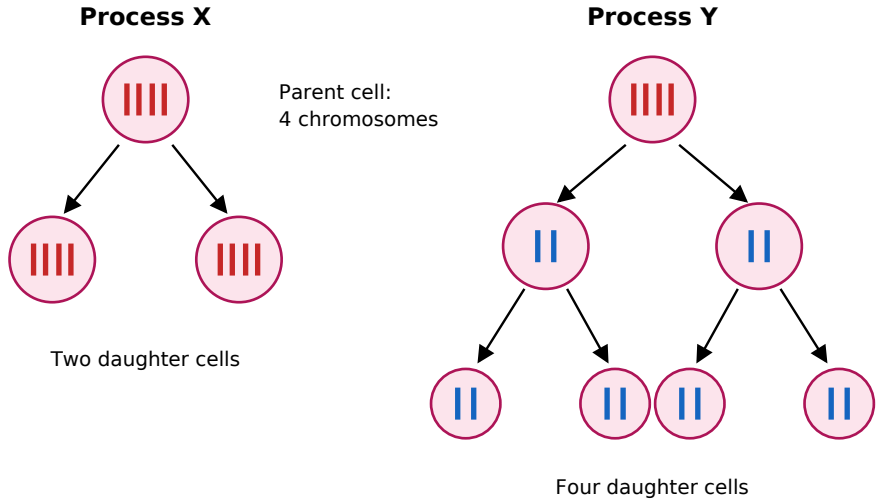


Fig. 6: Two types of cell division

A.

(i) Identify the processes X and Y. (1)

(ii) Write the number of chromosomes in each daughter cell formed by X and by Y. (1)

(iii) Which process helps in the healing of a cut on the skin? Give a reason. (1)

(iv) In which organs of human males and females does process Y occur? (1)

(v) How does Y help to restore the original chromosome number during fertilisation? (1)

OR

B.

(i) How many daughter cells are formed by X and by Y from one parent cell? (1)

(ii) How does X ensure that genetic information is maintained across body cells? (1)

(iii) Why do children resemble their parents but are not exactly the same? Link your answer to Y. (1)

(iv) What can happen if X is not controlled properly? (1)

(v) What problems can result from errors in Y? (1)

***** END OF QUESTION PAPER *****