

The Cell, Tissues and Diversity in Living Organisms

Science · Class 9 · Topic-wise Practice Worksheet

TIME 45 minutes	QUESTIONS 18	TOTAL MARKS 24	MAX. SCORE ___ / 24
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Name: _____ Class/Sec: _____ Date: _____

INSTRUCTIONS

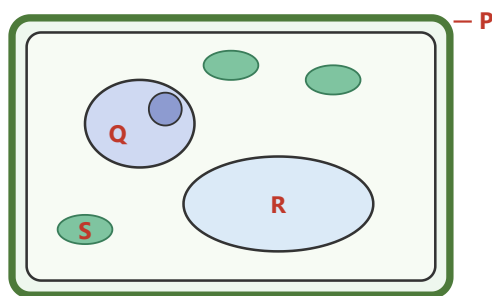
- There are **18 questions** in this worksheet. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–15 carry **1 mark** each. Questions 16–18 (Achievers Section) carry **3 marks** each.
- There is no negative marking. Study every diagram and table carefully.

Section A — Scientific Reasoning

Q1–Q8 · 1 mark each

- The basic structural and functional unit of every living organism is the _____.
 (A) Tissue (B) Organ system
 (C) Organ (D) Cell
- Cells were first observed and named by _____.
 (A) Robert Brown (B) Robert Hooke
 (C) Anton van Leeuwenhoek (D) Purkinje
- Mitochondria are called the powerhouses of the cell because they _____.
 (A) Store water and dissolved substances (B) Digest worn-out cell parts
 (C) Make proteins (D) Release energy in the form of ATP
- Which structure is present in a plant cell but **absent** in an animal cell?
 (A) Plasma membrane (B) Cell wall
 (C) Nucleus (D) Mitochondrion
- Water absorbed by the roots is carried up the plant by _____.
 (A) Phloem (B) Parenchyma
 (C) Xylem (D) Cambium
- The tissue that joins a muscle to a bone is _____.
 (A) Ligament (B) Areolar tissue
 (C) Cartilage (D) Tendon
- The five-kingdom classification of living organisms was proposed by _____.
 (A) R. H. Whittaker (B) Charles Darwin
 (C) Carolus Linnaeus (D) Ernst Haeckel
- A plant cell placed in a strong sugar solution shrinks away from its cell wall. This process is called _____.
 (A) Endosmosis (B) Plasmolysis
 (C) Diffusion (D) Turgidity

9. The diagram shows a plant cell. Which labelled structure contains the genetic material and controls all the activities of the cell?



A plant cell with four structures labelled P, Q, R and S

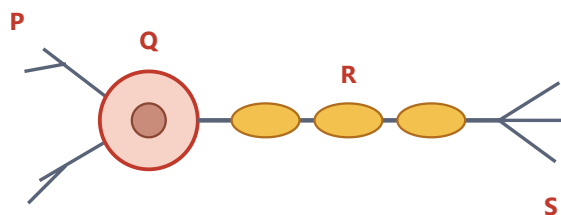
- (A) P
(B) Q
(C) R
(D) S
10. Blood is classified as a _____.
(A) Epithelial tissue
(B) Muscular tissue
(C) Connective tissue
(D) Nervous tissue
11. One row of the table below is **incorrectly** matched. Which row is it?

Row	Tissue	Function
(A)	Phloem	Transports prepared food
(B)	Meristematic tissue	Brings about growth by cell division
(C)	Cardiac muscle	Contracts rhythmically without tiring
(D)	Nervous tissue	Stores fat below the skin

Table 3.1 — Tissues and their functions

- (A) (A)
(B) (B)
(C) (C)
(D) (D)
12. Dry raisins placed in a bowl of water swell up after a few hours. This happens because water moves into the raisins by _____.
(A) Evaporation
(B) Osmosis, from a region of lower water concentration to higher
(C) Active transport, using energy
(D) Osmosis, from a region of higher water concentration to lower
13. A gardener finds that a plant grows taller mainly at the tips of its shoots. The tissue responsible is _____.
(A) Apical meristem
(B) Permanent tissue
(C) Sclerenchyma
(D) Cork cambium

14. The diagram shows a nerve cell. Which labelled part carries impulses **away** from the cell body?



A nerve cell with parts labelled P, Q, R and S

- (A) P
(B) Q
(C) R
(D) S
15. Which of these animals belongs to the phylum Chordata?
- (A) Earthworm
(B) Frog
(C) Starfish
(D) Prawn

Achievers Section

Q16–Q18 · 3 marks each

16. **Assertion (A):** Mitochondria and plastids are able to make some of their own proteins.
Reason (R): They possess their own DNA and ribosomes.
- (A) Both A and R are true and R is the correct explanation of A
(B) Both A and R are true but R is not the correct explanation of A
(C) A is true but R is false
(D) A is false but R is true
17. Three identical plant cells are placed for an hour in (i) distilled water, (ii) a very concentrated salt solution and (iii) a solution of the same concentration as the cell sap. What will be observed?
- (A) (i) becomes turgid, (ii) plasmolyses, (iii) stays unchanged
(B) (i) plasmolyses, (ii) becomes turgid, (iii) stays unchanged
(C) All three become turgid
(D) All three plasmolyse
18. Which of the following places the levels of biological classification in the correct order, from the largest group to the smallest?
- (A) Kingdom → Phylum → Class → Order → Family → Genus → Species
(B) Kingdom → Class → Phylum → Order → Family → Species → Genus
(C) Species → Genus → Family → Order → Class → Phylum → Kingdom
(D) Phylum → Kingdom → Class → Family → Order → Genus → Species

Answer Key

1	D	2	B	3	D	4	B	5	C
6	D	7	A	8	B	9	B	10	C
11	D	12	D	13	A	14	C	15	B
16	A	17	A	18	A				

Solutions

1. Answer: (D) Cell

The **cell** is the smallest unit that can carry out all the activities of life on its own. Tissues, organs and organ systems are all built up from cells.

2. Answer: (B) Robert Hooke

In 1665 **Robert Hooke** examined a thin slice of cork under his microscope and named the tiny box-like compartments "cells". Leeuwenhoek later saw living cells, and Robert Brown discovered the nucleus.

3. Answer: (D) Release energy in the form of ATP

Mitochondria carry out cellular respiration and **release energy as ATP**, the molecule cells spend on their activities. Protein synthesis is the job of ribosomes, and digestion of worn-out parts that of lysosomes.

4. Answer: (B) Cell wall

Only plant cells have a rigid **cell wall** of cellulose outside the plasma membrane, which gives them their fixed shape and protects them from bursting when they take in water. The other three structures are found in both.

5. Answer: (C) Xylem

Xylem conducts water and dissolved minerals upward from the roots, and its tracheids and vessels are dead, hollow tubes. Phloem carries prepared food, and it moves in both directions.

6. Answer: (D) Tendon

A **tendon** is a tough, fibrous connective tissue with great strength but limited flexibility, and it attaches muscle to bone. Ligaments, which are elastic, connect one bone to another.

7. Answer: (A) R. H. Whittaker

R. H. Whittaker proposed the five kingdoms — Monera, Protista, Fungi, Plantae and Animalia — in 1969, using cell structure, mode of nutrition and body organisation. Linnaeus gave the earlier two-kingdom system and binomial nomenclature.

8. Answer: (B) Plasmolysis

In a hypertonic solution water leaves the cell by osmosis, so the protoplasm shrinks and pulls away from the rigid cell wall — this is **plasmolysis**. Placing the same cell in pure water reverses it.

9. Answer: (B) Q

Q is the nucleus — the rounded body with a nucleolus inside it, which holds the chromosomes and directs the cell's activities. P is the cell wall, R the large central vacuole and S a chloroplast.

10. Answer: (C) Connective tissue

Blood is a **connective tissue**: its cells are suspended in a fluid matrix called plasma, and it links the different parts of the body by transporting gases, food, wastes and hormones.

11. Answer: (D) (D)

Nervous tissue carries electrical impulses; it is *adipose* tissue that stores fat beneath the skin. So row **(D)** is wrong. The other three functions are correctly matched.

12. Answer: (D) Osmosis, from a region of higher water concentration to lower

The raisin's contents are far more concentrated than the surrounding water, so water passes through the semi-permeable cell membranes **from the dilute outside to the concentrated inside**. This is endosmosis, and it needs no energy from the cell.

13. Answer: (A) Apical meristem

The **apical meristem** at the tips of roots and shoots keeps dividing and so increases the length of the plant. Permanent tissues have lost the power to divide, and sclerenchyma is dead tissue that only provides strength.

14. Answer: (C) R

R is the axon — the single long fibre, wrapped here in a sheath, that carries impulses away from the cell body towards the nerve endings. P shows the short branching dendrites that *receive* impulses, Q is the cell body and S the nerve endings.

15. Answer: (B) Frog

Chordates possess a notochord (replaced by a backbone in vertebrates), a dorsal nerve cord and paired gill pouches at some stage of life. The **frog** has all of these. The earthworm is an annelid, the starfish an echinoderm and the prawn an arthropod.

16. Answer: (A) Both A and R are true and R is the correct explanation of A

Both organelles carry a small circular DNA molecule together with ribosomes, and this genetic machinery lets them build some of their own proteins. Both statements are true, and possessing DNA and ribosomes is precisely **why** they can do so, so R explains A.

17. Answer: (A) (i) becomes turgid, (ii) plasmolyses, (iii) stays unchanged

In distilled water the outside is more dilute, so water enters and the cell swells until the wall stops it — it becomes turgid. In the concentrated salt solution water leaves and the cell plasmolyses. In a solution of equal concentration water moves both ways at the same rate, so there is no net change. Hence **(i) turgid, (ii) plasmolysed, (iii) unchanged.**

18. Answer: (A) Kingdom → Phylum → Class → Order → Family → Genus → Species

Classification runs from the broadest group to the narrowest: **Kingdom → Phylum → Class → Order → Family → Genus → Species.** Each step down shares more characteristics and holds fewer organisms; the reversed listing is the same hierarchy but read the wrong way, which the question rules out.