Cell: The Unit of Life

Standard difficulty · 20 questions · 40 marks · Time: 36 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer 8 × 1 = 8 marks

1. The cell theory was proposed by:

(a) Robert Brown **(b)** Rudolf Virchow alone
(c) Robert Hooke **(d)** Schleiden and Schwann

2. Which organelle is responsible for making proteins, especially for secretion?

(a) Rough endoplasmic reticulum **(b)** Nucleolus
(c) Centriole **(d)** Vacuole

3. The rough endoplasmic reticulum is bounded by:

(a) a double membrane **(b)** a triple membrane
(c) no membrane **(d)** a single membrane

4. In a micrograph magnified ×1,000, a cell measures 3 mm across. Its actual size is:

(a) 30 µm **(b)** 3,000 µm **(c)** 0.3 µm **(d)** 3 µm

5. A chromosome has arms 3 µm and 4 µm long on either side of its centromere. It is: (arm ratio long ÷ short: up to 1.7 metacentric, up to 3 sub-metacentric, above 3 acrocentric)

(a) telocentric **(b)** sub-metacentric
(c) metacentric **(d)** acrocentric

6. Which of these is found in prokaryotic cells only?

(a) A nuclear membrane **(b)** Chromosomes with histone proteins
(c) Mesosomes **(d)** Membrane-bound organelles

7. Chromoplasts contain or store:

(a) coloured, fat-soluble carotenoid pigments
(b) starch
(c) oils and fats
(d) chlorophyll and carotenoids, for photosynthesis

8. Assertion (A): The mitochondrion is bounded by a single membrane.
Reason (R): The nucleus, mitochondria and chloroplasts have double membranes, the endomembrane organelles single membranes, and ribosomes, centrioles and the nucleolus none.

(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.

Section B — Short answer — 8 × 2 = 16 marks

9. State the cell theory as modified by Virchow.

10. Name the organelle responsible for forming basal bodies of cilia and the spindle in animal cells, and say where it is found.

11. A cell 25 µm across is seen at ×1,000. How wide does its image appear, in mm?

12. A chromosome has arms of 0 µm and 8 µm on either side of the centromere. Classify it and explain. (Arm ratio long ÷ short: up to 1.7 metacentric, up to 3 sub-metacentric, above 3 acrocentric; no short arm telocentric.)

13. Which kind of cell has chromosomes with histone proteins?

14. What kind of membrane bounds the centriole, and what is its job?

15. What do elaioplasts contain or store?

16. Name or give: typical bacteria.

Section C — Word problems — 4 × 4 = 16 marks

17. Describe the structure and function of the nucleus.

18. In a drawing at ×2,000, a cell is 20 mm wide and its nucleus 10 mm. (a) Find the actual size of each in µm. (b) What fraction of the cell's width is the nucleus? (c) Why are cells measured in micrometres?

19. Compare the ribosome and the mesosome: their membranes, jobs and the cells in which they are found.

20. Identify the organelles: (a) it is responsible for controls the cell and carries the hereditary DNA; (b) it is responsible for forming basal bodies of cilia and the spindle in animal cells; (c) it is responsible for making proteins, especially for secretion. For each, say whether it has a membrane.

Want another sheet on this chapter? In the Ambiful Worksheets app every sheet is new, with its answer key, and your child never gets the same question twice.

Scan the code to get the free app, or open **worksheets.ambiful.com/get**

Answer key

Cell: The Unit of Life · AW-11B-CUL-2026-V1 · For parents — fold back or tear off before handing the sheet to your child.

Q	Answer	Working
1	**(d) Schleiden and Schwann**	Virchow added that all cells arise from pre-existing cells
2	**(a) Rough endoplasmic reticulum**	—
3	**(d) a single membrane**	—
4	**(d) 3 µm**	actual = image ÷ magnification = 3 mm ÷ 1,000 = 3 µm (1 mm = 1,000 µm)
5	**(c) metacentric**	arm ratio 1.33: arms equal or nearly so
6	**(c) Mesosomes**	—
7	**(a) coloured, fat-soluble carotenoid pigments**	—
8	**(d) A is false, but R is true.**	A is false: it has a double membrane. R is true.
9	**All living organisms are made of cells and products of cells, and all cells arise from pre-existing cells.**	—
10	**Centriole; animal cells**	—
11	**25 mm**	25 × 1,000 = 25,000 µm
12	**Telocentric: the centromere is at the very end**	—
13	**Eukaryotic**	—
14	**No membrane; forming basal bodies of cilia and the spindle in animal cells**	—
15	**Oils and fats**	—
16	**3–5 µm**	—
17	**A double-membraned nuclear envelope with a perinuclear space and nuclear pores, through which RNA and proteins move. Inside is the nucleoplasm with the nucleolus (site of rRNA synthesis) and chromatin (DNA with histone and other proteins), which condenses into chromosomes during division. It controls the cell's activities and carries the hereditary information.**	—
18	**(a) cell 10 µm, nucleus 5 µm; (b) 0.5 (about 50%); (c) cells are far smaller than a millimetre: 1 µm = 10^{-6} m**	actual = image ÷ magnification; 1 mm = 1,000 µm
19	**Ribosome: no membrane; protein synthesis; all cells. Mesosome: formed by an infolding of the plasma**	—

Q	Answer	Working
	membrane; helping in cell wall formation, DNA replication and respiration; bacteria.	
20	**(a) nucleus: double membrane; (b) centriole: no membrane; (c) rough endoplasmic reticulum: single membrane**	—