Practice Question Set For A-Level
Subject : Biology
Paper-1 Topic: 2 Cells

Merit Minds
www.merit-minds.com
Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Q1.

(a) Place a tick (✓) in the box next to the sequence that shows the correct order of magnitude of these measurements.

50 nm < 0.5 μm < 5×10^{-2} mm < 0.5×10^{-5} m ☐

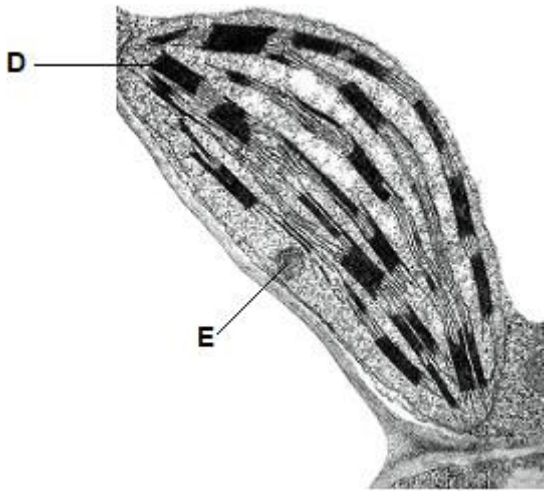
50 nm < 0.5 μm < 0.5×10^{-5} m < 5×10^{-2} mm ☐

0.5 μm < 50 nm < 0.5×10^{-5} m < 5×10^{-2} mm ☐

0.5 μm < 50 nm < 5×10^{-2} mm < 0.5×10^{-5} m ☐

(1)

The diagram below is an electron micrograph of a chloroplast.



(b) Identify structures labelled **D** and **E**.

D _____

E _____

(2)

(c) The detail shown in the diagram above would not be seen using an optical microscope.

Explain why.

Downloaded from www.merit-minds.com

_____

_____

_____

_____

_____

_____

(2)

(d) Name an organelle found in both a chloroplast and a prokaryotic cell.

_____

(1)

(e) A scientist determined the volume of a plant cell and the volume of organelles it contained.

They found:

- the volume of a plant cell is 17 500 μm^3
- the volume of all the mitochondria in a plant cell is 262.5 μm^3
- the volume of all the mitochondria and all the chloroplasts in a plant cell is 44.1% of the volume of a plant cell.

Use this information to calculate the volume of all the chloroplasts in a plant cell.

Answer = _____ μm^3

(2)

(f) A biologist separated cell components to investigate organelle activity. She prepared a suspension of the organelles in a solution that prevented damage to the organelles.

Describe **three** properties of this solution and explain how each property prevented damage to the organelles.

Property 1 _____

Explanation

_____

_____

_____

_____

Downloaded from www.merit-minds.com

Property 2 _____

Explanation

_____

_____

_____

_____

Property 3 _____

Explanation

_____

_____

_____

_____

(3)

(Total 11 marks)

Downloaded from www.merit-minds.com

Q2.

Read the following passage.

In laboratory tests, scientists investigated the effects of a new drug called ABZ on stomach tumour cells. They found ABZ stopped mitosis by preventing the formation of spindle fibres. They also found that ABZ affected some healthy cells.

Mitosis is a controlled process. Cyclin B is a protein found in a cell's nucleus. It regulates the timing of mitosis during the cell cycle. Mitosis starts when the concentration of Cyclin B in the nucleus rises sharply and ends when it falls. The scientists found that ABZ increased, and maintained, a high concentration of Cyclin B in stomach tumour cells.

Programmed cell death is called apoptosis. Two nuclear proteins, Bcl-2 and Bax, are involved in controlling apoptosis. Apoptosis is prevented when the ratio of Bcl-2 to Bax is high and is promoted when this ratio is low. The scientists found that ABZ decreased the concentration of Bcl-2 and increased the concentration of Bax in stomach tumour cells.

From their results the scientists claimed that ABZ could be used for the successful treatment of stomach cancer.

Use information from the passage and your own understanding to answer the questions.

(a) Suggest why preventing the formation of spindle fibres (lines 2–3) stopped the cell cycle.

_____

_____

_____

_____

_____

_____

(2)

(b) Suggest and explain why ABZ could be used as a treatment for cancer even though it affects some healthy cells (lines 3–4).

_____

_____

_____

_____

(1)

(c) What can you conclude about the effect of ABZ on tumour cells?

Use information about changes in the concentrations of Cyclin B (lines 6–7), and Bcl-2 and Bax (lines 10–14).

_____

Downloaded from www.merit-minds.com

(4)

(d) Evaluate the scientists' suggestion that ABZ could be used for the successful treatment of stomach cancer.

(3)
(Total 10 marks)

Downloaded from www.merit-minds.com