Eukaryotic & Prokaryotic Cell Structure & Function

Question Paper 5

Level	A Level
Subject	Biology
Exam Board	Edexcel
Topic	Cells & Viruses and Reproduction of Living Things
Sub Topic	Eukaryotic & Prokaryotic Cell Structure & Function
Booklet	Question Paper 5

Time Allowed: **53 minutes**

Score: **/ 44**

Percentage: **/100**

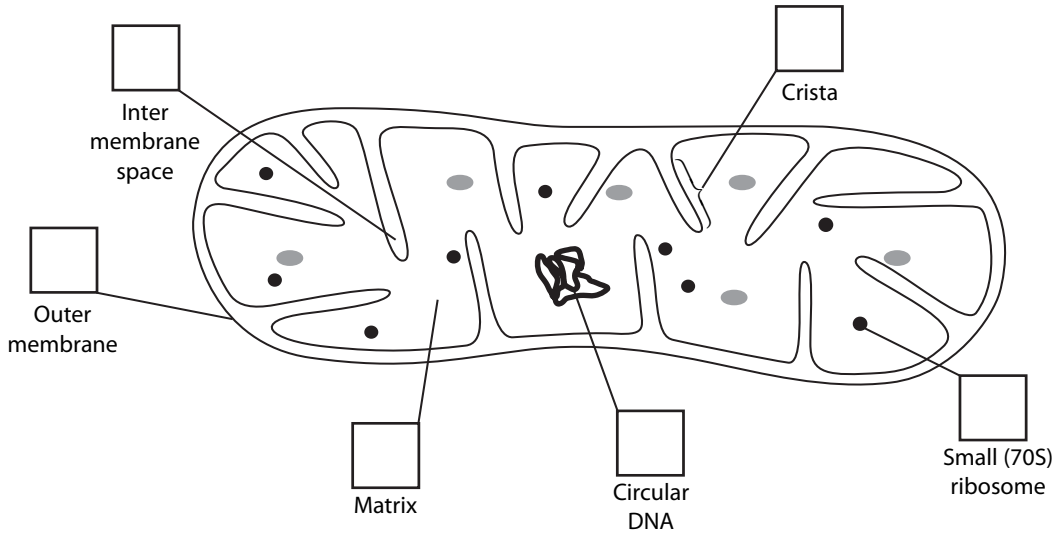
Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 Prokaryotes, mitochondria and chloroplasts have many features in common.

(a) (i) The diagram below shows a mitochondrion. Two of the features labelled are typical of prokaryotes. Place a tick (✓) in each of the **two** boxes that correctly identify these features.

(2)



(ii) The table below shows some features of mitochondria. If the feature is also present in chloroplasts, place a tick (✓) in the box to the right of that feature and if it is absent, place a cross (×) in the box.

(3)

Features present in mitochondria	**Feature present (✓) or absent (×) in chloroplasts**
Surrounded by a double membrane	
Crista present	
Circular DNA	
Matrix	
Glycogen granule	
Stalked particles	

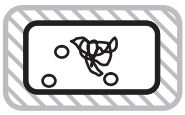
(b) Bacteria can be identified and classified by looking for certain features. Using the information in the passage below, label the five bacteria with the correct letter.

Bacterium P has a single flagellum to enable it to move whilst bacterium Q has several flagella.

Only bacterium R has visible plasmids and bacterium S has an infolding of its cell surface membrane.

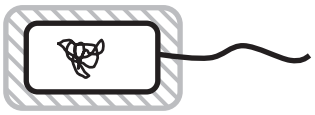
Bacterium T has a slime capsule.

(4)

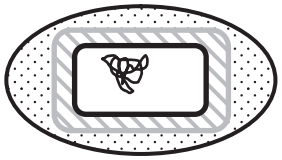


Bacterium .....

Bacterium .....



Bacterium .....



Bacterium .....

Bacterium .....

(Total for Question 1 = 9 marks)

2 The liver is an organ with many functions.

(a) (i) Give **one** difference between an organ and a tissue.

(1)

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(ii) Suggest **one** way in which tissues and organs are similar.

(1)

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(b) In a study of cell ultrastructure, a student was able to separate various cell organelles from a sample of liver cells. However, she was unsure of her ability to correctly identify the **three** organelles that she found. She produced a table containing a description of each organelle. Complete the table by writing in the correct name of each organelle.

(3)

Description of organelle	Name of organelle
Several curved membrane-bound sacs of decreasing size	
A pair of cylinders arranged at right-angles to each other	
Small spheres with a single membrane that are filled with hydrolytic enzymes	

(c) In the space below, draw a fully labelled diagram of a nucleus, as seen using an electron microscope.

(4)

(Total for Question 2 = 9 marks)

3 The cell cycle is involved in the production of new cells.

The table below shows the time spent in each stage for a cell with a cell cycle of 24 hours.

Stage of cell cycle	Time / hours
Production of proteins and organelles (G1 phase)	10
S phase	8
Production of proteins and organelles (G2 phase)	4
Mitosis	1
Cytokinesis	1

(a) Describe the **end result** of each of the following stages of this cell cycle.

(i) Mitosis

(2)

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(ii) S phase

(2)

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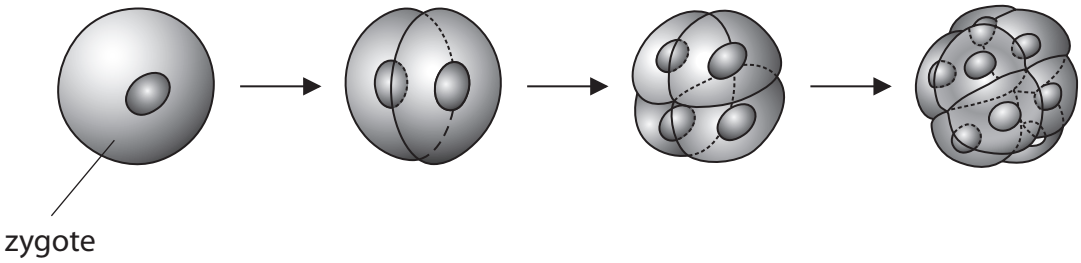
(b) After fertilisation, a zygote divides rapidly to produce more cells.

The diagram below shows a zygote and the results of the first three cell cycles.



(i) State the number of cells that would be present after **three** more cell cycles.

Place a cross ☒ in the box next to the correct answer.

(1)

☐ **A** 16

☐ **B** 32

☐ **C** 64

☐ **D** 128

(ii) The first few cell cycles may be as short as 30 minutes. They do not have G1 or G2 phases, only alternating S phases and mitosis.

Using information from the table and your own knowledge, suggest why the cells produced become smaller after each cell cycle.

(2)

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(c) Cells stop dividing as they become specialised.

Describe the processes that take place inside a cell during specialisation.

(4)

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(d) Specialised cells of an embryo become tissues and organs in the fetus.

Give **two** differences between tissues and organs.

(2)

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2 .....

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(Total for Question 3 = 13 marks)

4 As part of the immune response, a B cell has to be activated. It then divides to form a clone of cells. These cells then differentiate into plasma cells, which produce antibodies.

(a) Describe how a B cell is activated.

(3)

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(b) (i) Name the type of division that occurs when B cells are cloned.

(1)

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(ii) Suggest how a microscope slide could be prepared to observe cell division in B cells.

(3)

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(c) The electronmicrograph below shows a plasma cell. Some structures inside this cell have been labelled.

Magnification ×10 000

Place a cross ☒ in the box to identify each of the following structures.

(i) Structure P

(1)

☐ **A** chloroplast

☐ **B** Golgi apparatus

☐ **C** mitochondrion

☐ **D** nucleus

(ii) Structure R

(1)

☐ **A** cytoplasm

☐ **B** lysosome

☐ **C** nucleus

☐ **D** vacuole

(iii) Name structure Q.

(1)

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(iv) Describe the role of structure Q in the production of antibodies.

(3)

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(Total for Question 4 = 13 marks)