THIS IS A NEW SPECIFICATION

OCR
RECOGNISING ACHIEVEMENT

ADVANCED SUBSIDIARY GCE

BIOLOGY

Cells, Exchange and Transport

F211

Candidates answer on the question paper

OCR Supplied Materials:
None

Other Materials Required:
- Electronic calculator
- Ruler (cm/mm)

Wednesday 14 January 2009
Afternoon

Duration: 1 hour

CUP/T77123

F211

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **60**.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.
- Where you see this icon you will be awarded marks for the quality of written communication in your answer.
- This document consists of **16** pages. Any blank pages are indicated.

FOR EXAMINER'S USE		
Qu.	**Max.**	**Mark**
1	**11**	
2	**11**	
3	**10**	
4	**11**	
5	**10**	
6	**7**	
TOTAL	**60**	

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Answer **all** the questions.

1 Fig. 1.1 is a diagram of an animal cell as seen using a transmission electron microscope.

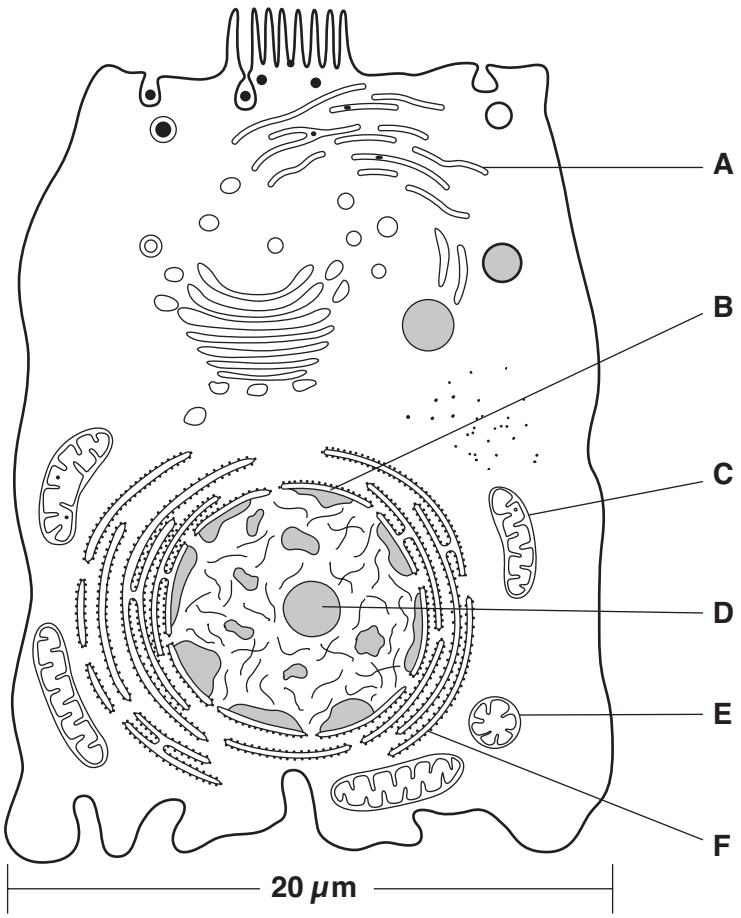


Fig. 1.1

(a) (i) Name the structures of the cell labelled **A**, **B**, **C** and **D**.

A .....

B .....

C .....

D ..... **[4]**

(ii) Structures **C** and **E** are examples of the same organelle.

Suggest why **E** looks so different to **C**.

.....

.....

.....

..... **[2]**

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(iii) Calculate the actual length of structure **C**.

Show your working and give your answer in micrometres (μm).

Answer = ... μm **[2]**

(b) Proteins are produced by the structure labelled **F**. Some of these proteins may be **extracellular** proteins that are released from the cell.

Outline the sequence of events following the production of extracellular proteins that leads to their release from the cell.

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..... **[3]**

[Total: 11]

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2 Fig. 2.1 shows diagrams of four cells that have been placed in different solutions.

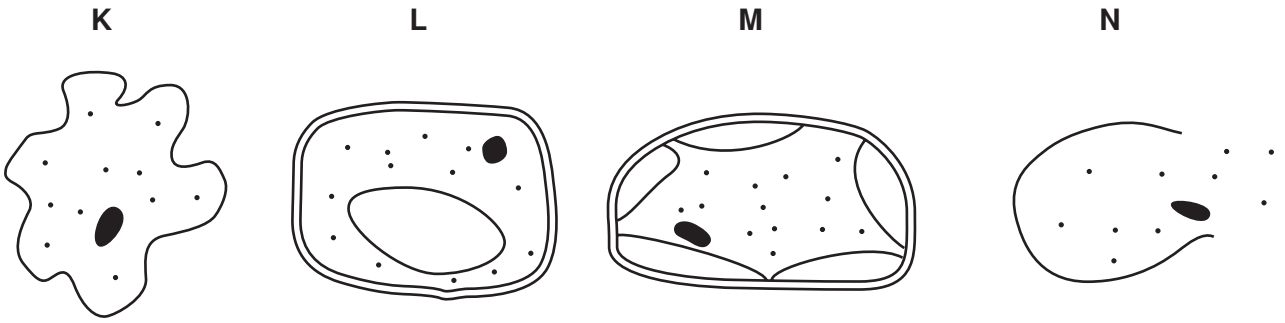


Fig. 2.1

(a) In the table below, write the letter **K**, **L**, **M** or **N** next to the description that best matches the diagram. One has been done for you.

description	letter
an animal cell that has been placed in distilled water	
an animal cell that has been placed in a concentrated sugar solution	
a plant cell that has been placed in distilled water	
a plant cell that has been placed in a concentrated sugar solution	M

[3]

(b) Explain, using the term **water potential**, what has happened to cell **M**.

.....

.....

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..... **[3]**

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(c) Small non-polar substances enter cells in different ways to large or polar substances.

Outline the ways in which substances, **other than water**, can enter a cell through the plasma (cell surface) membrane.

In your answer, you should use appropriate technical terms, spelt correctly.

small, non-polar substances .....

.....

.....

.....

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large substances .....

.....

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polar substances .....

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..... **[5]**

[Total: 11]

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3 The division of stem cells by mitosis produces cells that are genetically identical.

(a) (i) State what is meant by the term *stem cell*.

.....

.....

.....

..... **[2]**

(ii) Name **one** tissue in **plants** that contains stem cells.

..... **[1]**

(b) State **three** reasons why mitosis is important to organisms.

1 .....

2 .....

3 ..... **[3]**

(c) Traditionally, stem cells from bone marrow have been used to treat patients with leukaemia.

Recent studies have shown that stem cells taken from umbilical cord blood may be more effective in treating leukaemia than stem cells taken from bone marrow.

Table 3.1 shows the probability of a patient remaining leukaemia-free for five years after being treated with stem cells from different sources.

Table 3.1

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Source: Miami Herald, www.miamiherald.com

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(i) Describe, using the information in Table 3.1, the evidence that **perfectly matched** umbilical cord blood stem cells are more effective than bone marrow stem cells in treating leukaemia.

.....

.....

.....

.....

..... **[2]**

(ii) Suggest **two** advantages, **other than an increased probability of survival**, of using umbilical cord blood stem cells instead of bone marrow stem cells in transplant procedures.

.....

.....

.....

.....

..... **[2]**

[Total: 10]

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4 **(a)** Explain, using the term **surface area to volume ratio**, why large, active organisms need a specialised surface for gaseous exchange.

.....

.....

.....

.....

.....

..... **[2]**

(b) Table 4.1 describes some of the features of the mammalian gas exchange system.

Complete the table by explaining how each feature improves the efficiency of gaseous exchange. The first one has been completed for you.

Table 4.1

feature of gas exchange system	how feature improves efficiency of gaseous exchange
many alveoli	this increases the surface across which oxygen and carbon dioxide can diffuse
the epithelium of the alveoli is very thin	
there are capillaries running over the surface of the alveoli	
the lungs are surrounded by the diaphragm and intercostal muscles	

[3]

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(c) Outline how the diaphragm **and** intercostal muscles cause **inspiration**.

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..... **[4]**

(d) Fig. 4.1 shows the trace from a spirometer recorded from a 16-year-old student.

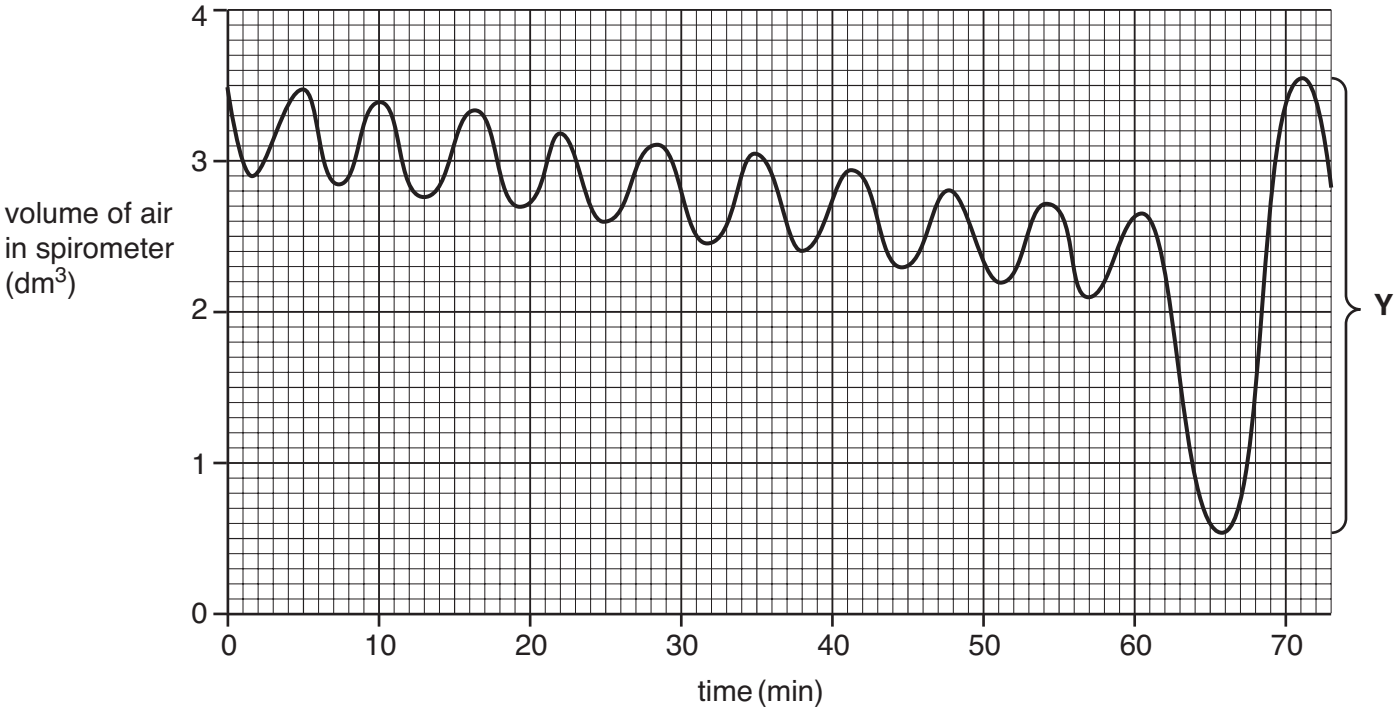


Fig. 4.1

(i) **Label on the trace**, using the letter **X**, a point that indicates when the student was inhaling. **[1]**

(ii) At the end of the trace the student measured his vital capacity. This is indicated by the letter **Y**.

State the vital capacity of the student.

..... **[1]**

[Total: 11]

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5 Fish have a single, closed circulatory system.

(a) State the meaning of the terms *single circulatory system* and *closed circulatory system.*

single circulatory system .....

.....

.....

closed circulatory system .....

.....

..... **[2]**

(b) The heart of a mammal contains four main chambers. The action of these chambers is coordinated by electrical activity in specialised tissues.

Fig. 5.1 shows where these tissues are found in the heart.

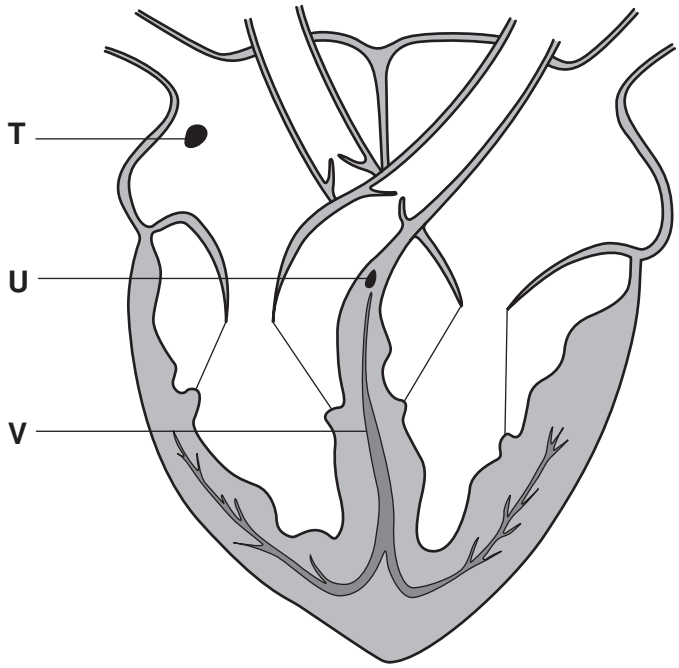


Fig. 5.1

(i) Name the tissues labelled **T**, **U** and **V**.

T .....

U .....

V ..... **[3]**

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(ii) Describe how the action of the heart is initiated **and** coordinated.



In your answer, you should use appropriate technical terms, spelt correctly.

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..... **[5]**

[Total: 10]

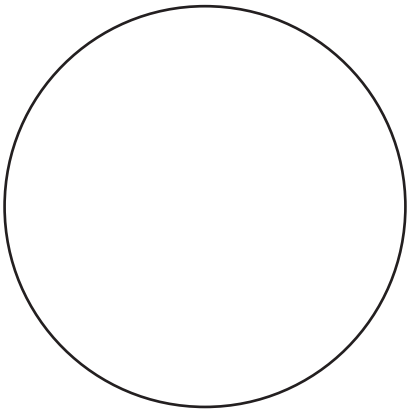
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6 Translocation is the movement of the products of photosynthesis within a plant.

Translocation occurs in the phloem and involves sources and sinks.

(a) Using the outline below, draw in the position of the phloem in the root of a dicotyledonous plant.

root



[1]

(b) Research using carbon dioxide containing a radioactive label, C^{14}, has revealed the following evidence about the mechanism of translocation:

A labelled carbon can be observed in the phloem soon after being supplied to a well-lit plant;

B the rate of movement of sugars in the phloem is many times faster than could be achieved by diffusion alone.

Different research has revealed that:

C an insect such as an aphid feeds by inserting its proboscis (mouth parts) into the phloem;

D the pH of the phloem companion cells is lower than surrounding cells;

E the phloem companion cells contain many mitochondria.

Using the letters **A**, **B**, **C**, **D** and **E**, select **two** pieces of evidence from the list above which support the theory that translocation occurs in the phloem.

……

…… **[2]**

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(c) State what is meant by the terms *source* and *sink*.

.....

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..... **[2]**

(d) When the bark is removed from a tree, the phloem is also removed. If a complete ring of bark is removed, the tree trunk can be seen to swell above the cut.

Suggest **two** reasons why the trunk swells above the cut.

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..... **[2]**

[Total: 7]

END OF QUESTION PAPER

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