OCR
RECOGNISING ACHIEVEMENT

Monday 14 May 2012 – Morning

AS GCE BIOLOGY

F211 Cells, Exchange and Transport

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
- Electronic calculator
- Ruler (cm/mm)

Duration: 1 hour

F211060611

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. If additional space is required, you should use the lined page at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the bar codes.

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**.
- Where you see this icon you will be awarded marks for the quality of written communication in your answer.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.
- This document consists of **16** pages. Any blank pages are indicated.

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Answer **all** the questions.

1 **(a)** Yeast reproduces asexually by a process called budding. During this process, cell division occurs.

(i) Name the type of cell division that occurs in asexual reproduction.

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

(ii) Before the division of the nucleus of a cell, the genetic material must replicate.

Explain why this is essential.

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

(b) Unlike yeast, the nuclei of most eukaryotic organisms contain homologous pairs of chromosomes.

Explain what is meant by a *homologous pair of chromosomes*.

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

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(c) In most multicellular organisms, the cells produced by cell division are organised into tissues.

(i) State what is meant by the term *tissue*.

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

(ii) Complete Table 1.1 below comparing two types of epithelium, squamous epithelium and ciliated epithelium.

For each type of epithelium, state **one** function of the tissue and **one** specific location in the human body where it is found.

Table 1.1

type of epithelium	function of tissue	specific location in the human body
squamous		
ciliated		

[4]

[Total: 12]

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2 Fig. 2.1 is a diagram of a cell showing the organelles involved in the production and secretion of an extracellular protein. The rough endoplasmic reticulum (RER) is shown enlarged at the side of the diagram.

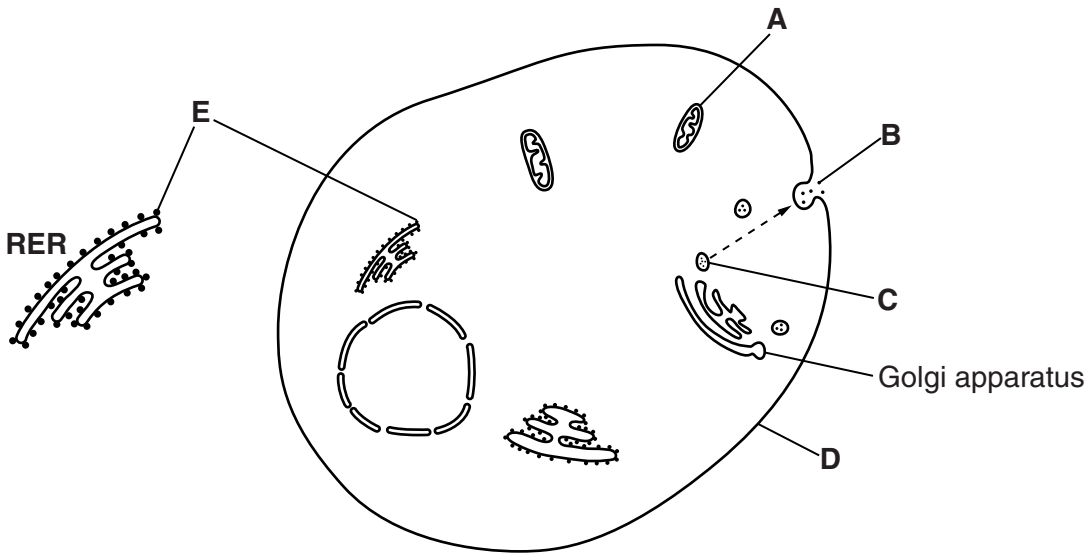


Fig. 2.1

(a) (i) Name the structures labelled **C**, **D** and **E**.

C .....

D .....

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

(ii) Suggest **one** type of extracellular protein secreted at **B**.

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

(iii) Organelle **A** provides ATP which is a source of energy.

Suggest **one** stage during the secretion of a protein that requires energy.

.....

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

(iv) Outline the role of the Golgi apparatus.

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

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(b) The cell shown in Fig. 2.1 is a eukaryotic cell.

(i) Identify **two** features, **visible in Fig. 2.1**, which would **not** be present in a prokaryotic cell.

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.....

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

(ii) Name **one** feature that would be present in the cytoplasm of a prokaryotic cell that is **not** found in a eukaryotic cell.

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

[Total: 10]

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3 Fig. 3.1 provides information about the blood pressure in different parts of the mammalian blood circulatory system.

Fig. 3.1 also shows the **total** cross-sectional area of the vessels, relative to one another, in parts of the blood circulatory system.

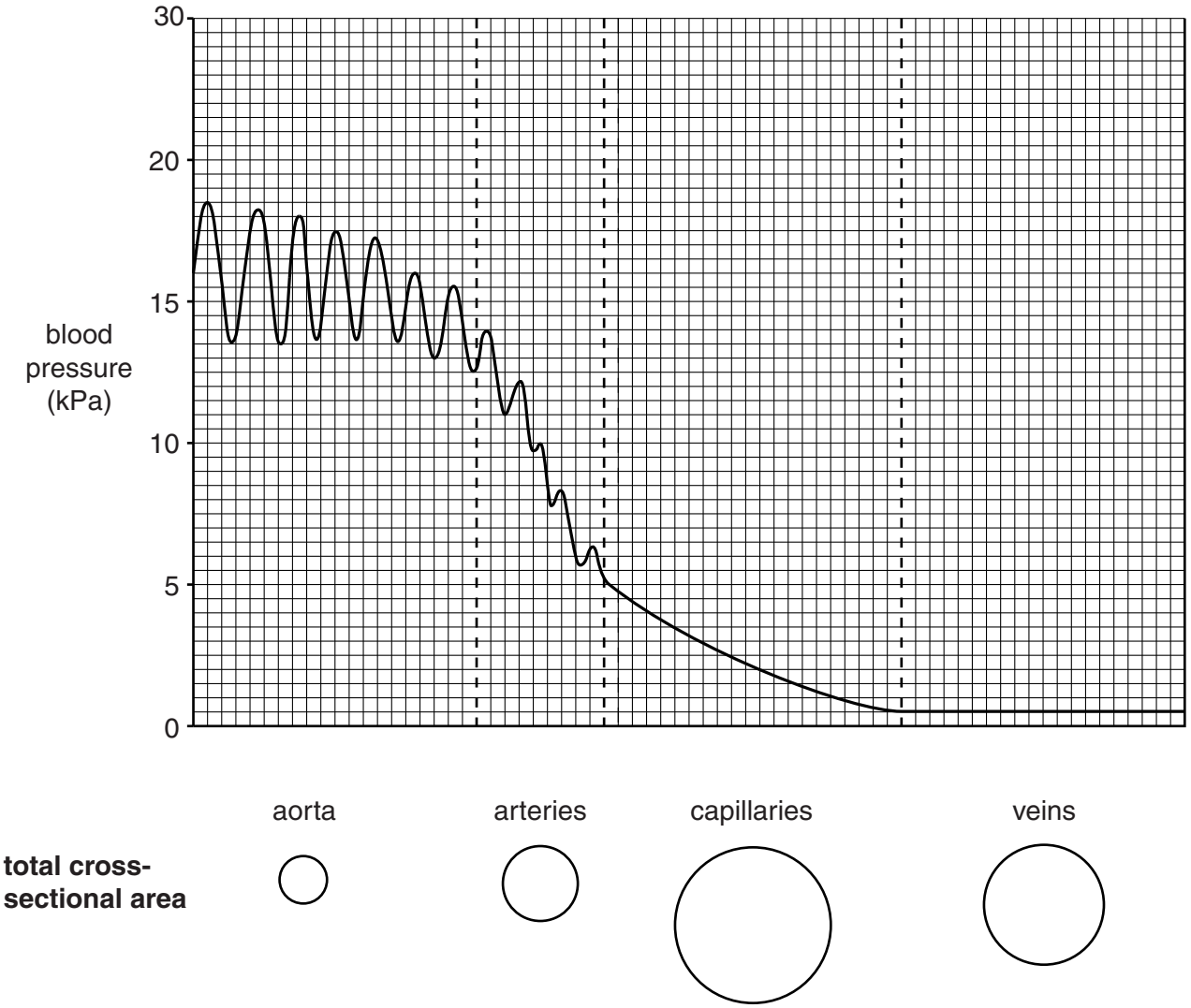


Fig. 3.1

(a) Place a tick (✓) in the box below that most closely describes the mammalian blood circulatory system.

	open circulatory system	closed circulatory system
single circulatory system		
double circulatory system		

[1]

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(b) The pressure fluctuates as the blood flows along the aorta, as shown in Fig. 3.1.

(i) Explain what causes this fluctuation.

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

(ii) State the term used to describe the number of fluctuations per minute.

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

(c) Using the information in Fig. 3.1, describe the pressure changes in the blood as it flows through the circulatory system from the aorta to the veins.

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

(d) **(i)** Using the information in Fig. 3.1, explain what causes the overall change in pressure as blood flows from the aorta to the arteries and from the arteries to the capillaries.

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

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(ii) Explain why it is important that the pressure changes as blood flows from the aorta to the capillaries.

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

[Total: 11]

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4 **(a)** A student wanted to observe some red blood cells under the microscope. The student placed a small sample of blood onto a microscope slide and added a drop of distilled water. When viewed at high power, the student observed that the red blood cells had burst.

In a similar procedure using plant epidermis, the student observed that the plant cells did not burst.

(i) Explain these observations.



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

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

(ii) Suggest how the student could modify the procedure to observe red blood cells without them bursting.

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

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(b) Oxygen enters red blood cells as they pass through the capillaries in the lungs.

Name the mechanism by which oxygen enters the red blood cells.

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

(c) The cells in the epidermis of a plant root are specialised to absorb minerals from the surrounding soil.

State the process by which root epidermal cells absorb minerals from the soil **and** describe how these cells are specialised to achieve absorption.

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

[Total: 10]

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QUESTION 5 STARTS ON PAGE 12

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5 Fig. 5.1 shows the changes in the volume of air in the lungs of a student at rest during one breath.

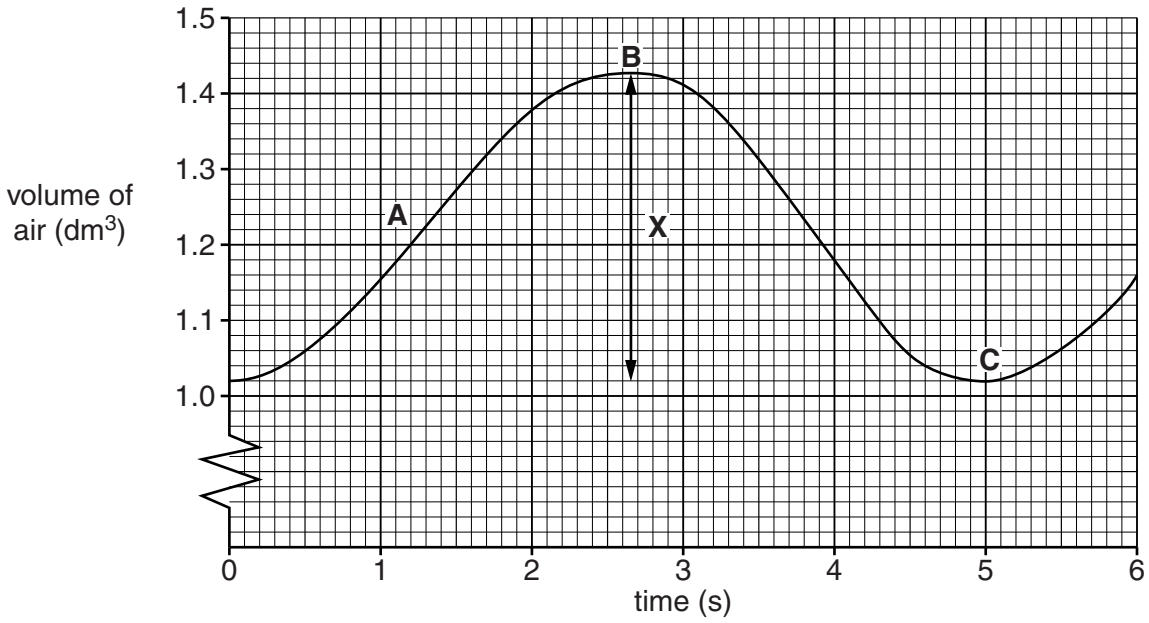


Fig. 5.1

(a) (i) Name the measurement represented by the line **X**.

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

(ii) What is happening to the elastic fibres in the walls of the alveoli at point **A**?

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

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(b) Explain what causes the change in the volume of air between points **B** and **C** on Fig. 5.1.

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

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

(c) Using Fig. 5.1, calculate the breathing rate of this student in breaths per minute.

Answer = ... breaths per minute **[2]**

(d) About 1 dm^3 of air cannot be expelled from the lungs. This is known as the residual volume.

Suggest why it is **not** possible to expel all the air from the lungs.

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

[Total: 10]

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6 Fig. 6.1 shows an aphid feeding from a plant stem. The aphid feeds by inserting its tube-like mouthparts into the tissue that transports sugar solution. Some details of this transport tissue are shown in the vertical section.

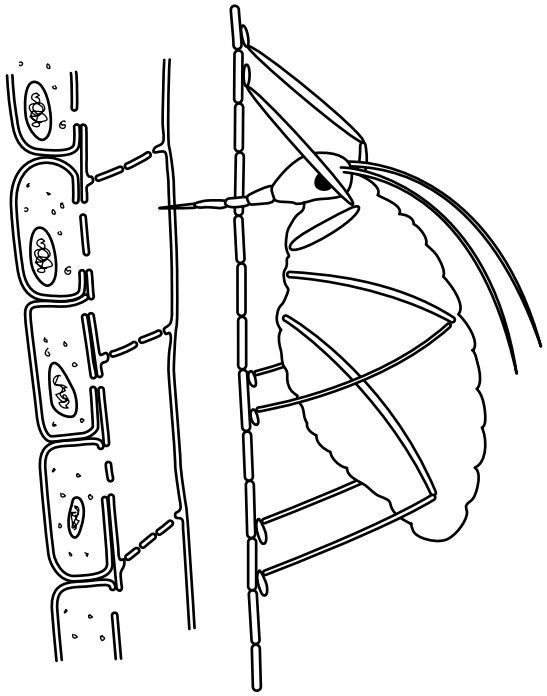


Fig. 6.1

(a) (i) Name the sugar most commonly transported through the stem of a plant **and** the tissue that transports this sugar.

sugar .....

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

(ii) Sugar molecules are actively loaded into the transport tissue.

Describe how active loading takes place.

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

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(b) A classic experiment investigated the effect of temperature on the rate of sugar transport in a potted plant.

Aphid mouthparts were used to take samples of sugar solution from the transport tissue in the stem. The sugary solution dripped from the mouthparts. The number of drips per minute was counted.

The procedure was repeated at different temperatures.

Table 6.1 shows the results obtained.

Table 6.1

temperature (°C)	number of drips per minute
5	3
10	6
20	14
30	26
40	19
50	0

Suggest brief explanations for these results.

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

[Total: 7]

END OF QUESTION PAPER

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ADDITIONAL PAGE

If additional space is required, you should use the lined page below. The question number(s) must be clearly shown.

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