Candidate Name	Centre Number	Candidate Number
		2

WJEC CBAC

GCE AS/A level

1072/01 **New AS**

BIOLOGY/HUMAN BIOLOGY – BY2

P.M. MONDAY, 1 June 2009

1½ hours

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	**10**	
2	**11**	
3	**13**	
4	**17**	
5	**9**	
6	**10**	
Total	**70**	

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

The quality of written communication will affect the awarding of marks.

1. *(a)* Complete the following table, which shows the classification of some organisms, including **two** features only of the phylum where applicable. [9]

Kingdom	*Phylum*	*Features of phylum*	*Class*	*Example*
Animalia	Annelida	1. 2.	Polychaeta	Lugworm *Arenicola marina*
Animalia		Soft moist skin; External fertilisation; Aquatic larvae with gills; Adults simple lungs.		Common frog *Rana temporaria*
Animalia		1. 2.		Desert locust *Schistocerca gregaria*
	Basidiomycota	Hyphae; Cell wall of chitin; Reproduce using spores; No flagella;	Basidiomycetes	Field mushroom *Agaricus campestris*

(b) What is the name of the genus of the Desert locust? [1]

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(Total 10 marks)

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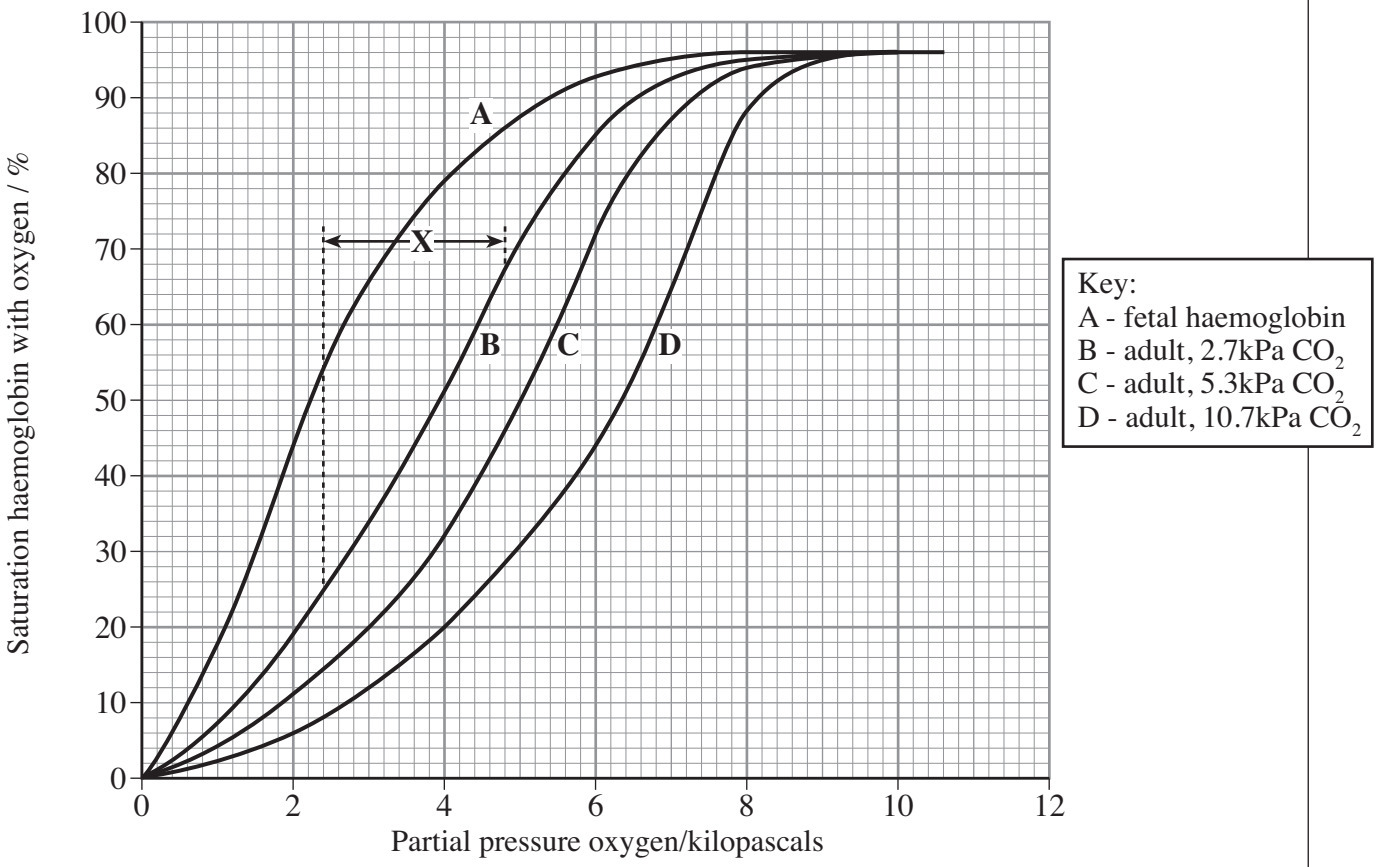
2. The oxygen dissociation curves below, show the relationship between the partial pressure of oxygen and the percentage oxygen saturation of two respiratory pigments. Curve A shows the response of fetal haemoglobin and curves B, C and D the response of adult haemoglobin in the blood at three different partial pressures of carbon dioxide.



(a) (i) How many **molecules** of oxygen can one molecule of haemoglobin carry when it is fully saturated ? [1]

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(ii) What percentage of the oxygen binding sites in the haemoglobin in curve **B** are empty in the capillaries of the human lung? [1]

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(b) The curve is steepest in the region marked **X** on the graph. Explain how the steepness of the curve in region **X** helps the tissues in a mammal function more efficiently. [2]

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(c) (i) Suggest a tissue in the body of a mammal where the partial pressure of carbon dioxide is likely to be as high as in curve **D**. [1]

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(ii) What is the advantage of an increasing partial pressure of carbon dioxide in a muscle? [2]

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(d) (i) Explain the importance of the position of the dissociation curve of fetal haemoglobin. [2]

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(ii) Curve **A** is similar to a curve obtained when investigating the oxygen carrying capacity of the respiratory pigment of a lugworm which burrows in mud. Explain how this curve indicates the worm's adaptation to its environment. [2]

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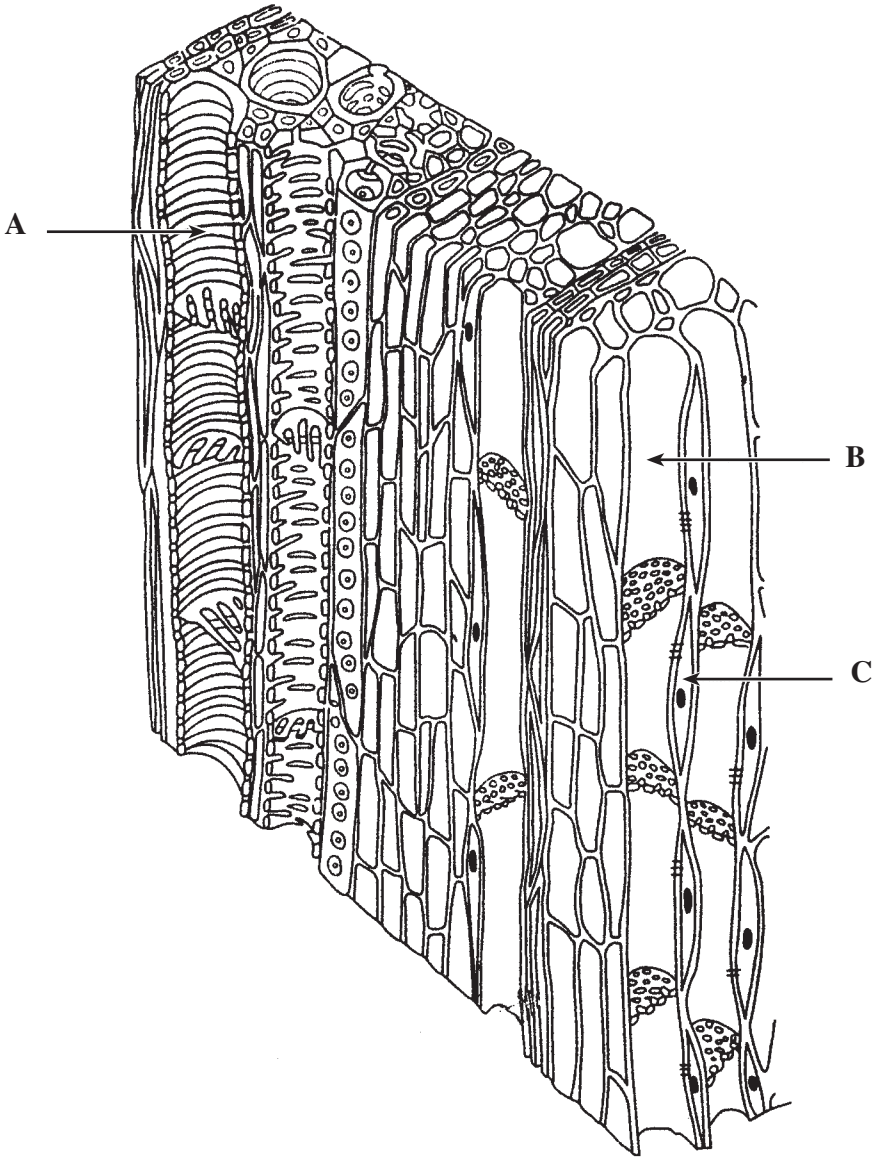
(Total 11 marks)

3. The diagram below is a three-dimensional drawing of part of a stem.



(a) Identify the cells **A**, **B** and **C** and give a function for each. [6]

A .....

Function .....

.....

B .....

Function .....

.....

C .....

Function .....

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(b) Cell **A** has a secondary cell wall which contains the substance lignin. Explain the function of this material in the cell wall. [2]

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(c) Complete the following passage, using **one** of the following, in **each** of the spaces provided. [5]

adhesive, cohesive, casparian strip, apoplast, symplast, hydrophilic, hydrophobic, vacuolar pathway, capillarity.

Water is absorbed into the root mainly through the root hairs. Its movement through the apoplast is prevented by the ..... in the endodermis. Movement through the ..... is aided by the plasmodesmata. The water is pulled upwards by the transpiration pull and this is possible by large ..... forces between the water molecules and ..... forces between the water molecules and the ..... lining of the cells.

(Total 13 marks)

4. *(a)* All living organisms exchange gases with the environment. Respiratory surfaces in all organisms have a very large surface area. Give **three** *other* properties of respiratory surfaces common to **all** organisms. [3]

1 .....

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2 .....

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3 .....

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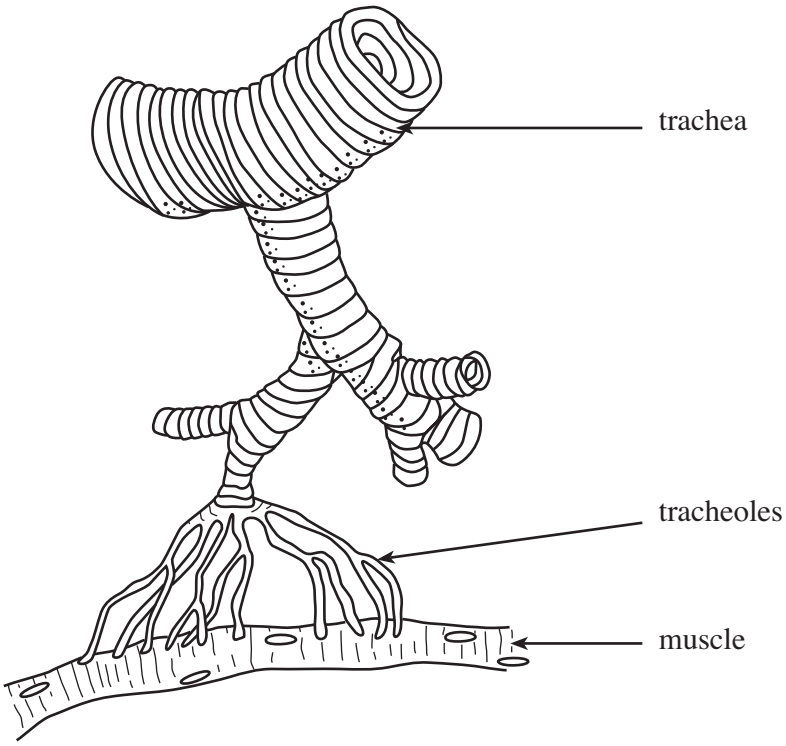
(b) Insects use a tracheal system for gas exchange, as shown below.



(i) On the diagram use a line **labelled R** to show the respiratory surface. [1]

(ii) State **two** advantages of using a tracheal system for gas exchange. [2]

1 .....

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2 .....

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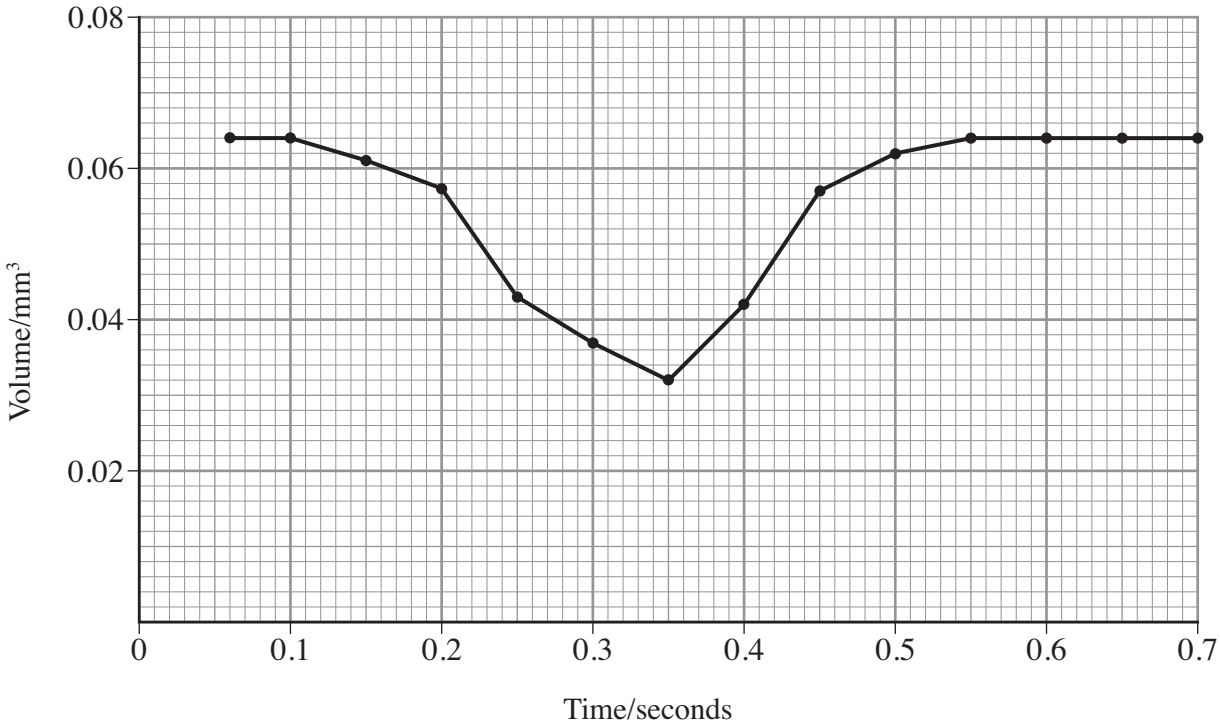
(iii) The graph shows the volume change in the main trachea in the anterior thorax and head of a beetle.



Calculate the percentage (%) volume change. Show your working. [2]

Answer .....

(c) Describe and explain the process of inspiration in a mammal. [4]

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(d) Gas exchange in fish takes place across a special surface, the gill.

(i) State the difficulties aquatic organisms face, compared to terrestrial organisms, in obtaining oxygen from water. [2]

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(ii) In cartilaginous fish, such as sharks, a parallel flow system operates in the gills and in bony fish such as Mackerel a counter current flow system is found.
Explain what is meant by the terms *parallel flow* and *counter current flow* and state why the counter current system is more efficient. [3]

Parallel flow

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Counter current flow

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Reason counter current flow is more efficient

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(Total 17 marks)

5. *(a)* Many organisms can reproduce sexually and asexually. Give **two** advantages and **two** disadvantages of sexual reproduction. [4]

Advantages

1 .....

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2 .....

.....

Disadvantages

1 .....

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2 .....

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(b) Suggest **two** reasons why most terrestrial animals rely on internal fertilisation. [2]

1 .....

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2 .....

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(c) Suggest **three** reasons why the flowering plants have been so successful in the colonisation of the land. [3]

1 .....

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2 .....

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3 .....

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(Total 9 marks)

Examiner only

6. Answer **one** of the following questions.
Any diagrams included in your answer must be fully annotated.

Either, *(a)* Describe the theory of evolution, as put forward by Charles Darwin, suggesting any evidence which supports his views. [10]

Or *(b)* (i) Compare the dentition of a carnivore and a grazing herbivore.
(ii) Describe how the gut region of a ruminant is adapted to its diet. [10]

Examiner only

Examiner only

(Total 10 marks)