| Centre No. | | | | | |
|---|---|---|---|---|---|
| Candidate No. | | | | | |

| Paper Reference (complete below) | | | | | | |
|---|---|---|---|---|---|---|
| | | | | / | | |

| Surname | Initial(s) |
|---|---|
| Signature | |

Examiner's use only

| | | |
|---|---|---|
| | | |

Team Leader's use only

| | | |
|---|---|---|
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Paper Reference(s)

**6102/01**

# Edexcel GCE

## Biology

## Advanced Subsidiary/Advanced

Unit Test 2B

Thursday 9 January 2003 – Morning

Time: 1 hour 15 minutes

**Materials required for examination**
Ruler

**Items included with question papers**
Nil

| Question Number | Leave Blank |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
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| Total | |

**Instructions to Candidates**

In the boxes above, write your centre number, candidate number, the paper reference, your signature, your surname and initials. The paper reference is shown above.
Check that you have the booklet for the correct unit.
Answer ALL NINE questions in the spaces provided in this booklet.
Your answer to Question 9 should be written on the lined pages. If you need to use additional answer sheets, attach them loosely but securely inside this booklet.
Show all the steps in any calculations and state the units. Calculators may be used.
Include diagrams in your answers where these are helpful.

**Information for Candidates**

The marks for individual questions and parts of questions are shown in round brackets: e.g. (**2**).
The total mark for this paper is 70.

**Advice to Candidates**

You will be assessed on your ability to organise and present information, ideas, descriptions and arguments clearly and logically, taking account of your use of grammar, punctuation and spelling.

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Success through qualifications

**Answer ALL questions in the spaces provided.**

*Leave blank*

**1.** The table below lists some enzymes associated with carbohydrate digestion in humans, their site of secretion and product(s) of their action.

Complete the table by filling in the blank spaces.

| Enzyme | Site of secretion | Product(s) |
|---|---|---|
| Amylase | | |
| | Lining (mucosa) of ileum | Glucose and galactose |
| Sucrase | | Glucose and fructose |

**Q1**

**(Total 4 marks)**

**2.** (a) Cardiac muscle contracts myogenically. Explain what is meant by the term **myogenic**.

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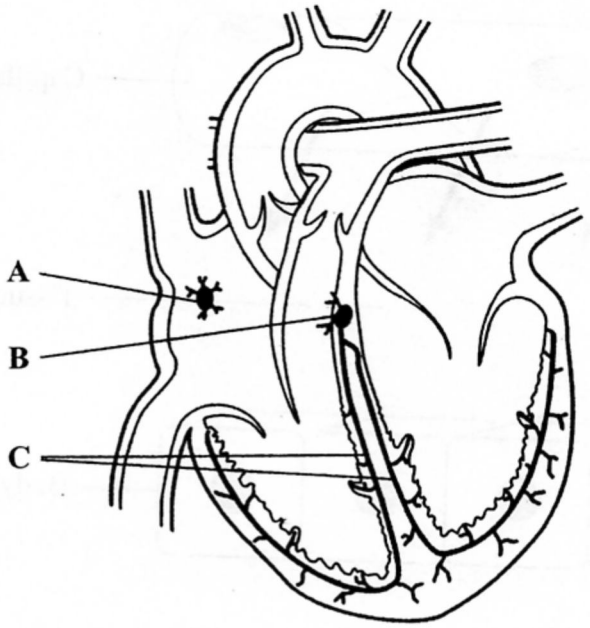
**(2)**

(b) The diagram below shows structures in the heart which are concerned with the coordination of contraction.

*Leave blank*




(i) Name parts **A**, **B** and **C**.

**A** .....

**B** .....

**C** .....

**(3)**

(ii) Explain how the structures shown in the diagram coordinate the contraction of the heart.

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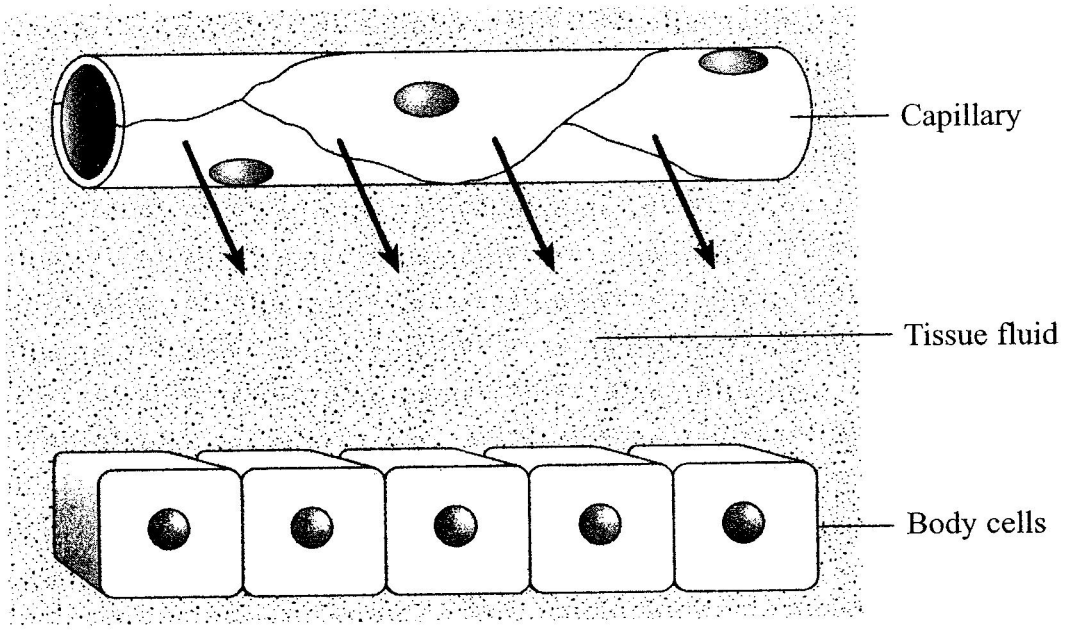
**(3)**

**Q2**

**(Total 8 marks)**

*Leave blank*

**3.** The diagram below shows the formation of tissue fluid from part of a capillary.




(a) Describe how tissue fluid is formed.

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**(2)**

(b) The table below shows the concentration of some solutes in blood plasma and tissue fluid.

*Leave blank*

| Solute | Concentration in blood plasma /mmol $dm^{-3}$ | Concentration in tissue fluid /mmol $dm^{-3}$ |
|---|---|---|
| Potassium ions | 4.0 | 4.0 |
| Sulphate ions | 0.5 | 0.5 |
| Protein | 2.0 | Less than 0.1 |

(i) Compare the concentrations of these solutes in blood plasma and tissue fluid.

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**(2)**

(ii) Suggest explanations for the difference in the concentration of these solutes in blood plasma and tissue fluid.

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**(3)**

**Q3**

**(Total 7 marks)**

**4.** (a) Explain what is meant by **implantation** in relation to human reproduction.

*Leave blank*

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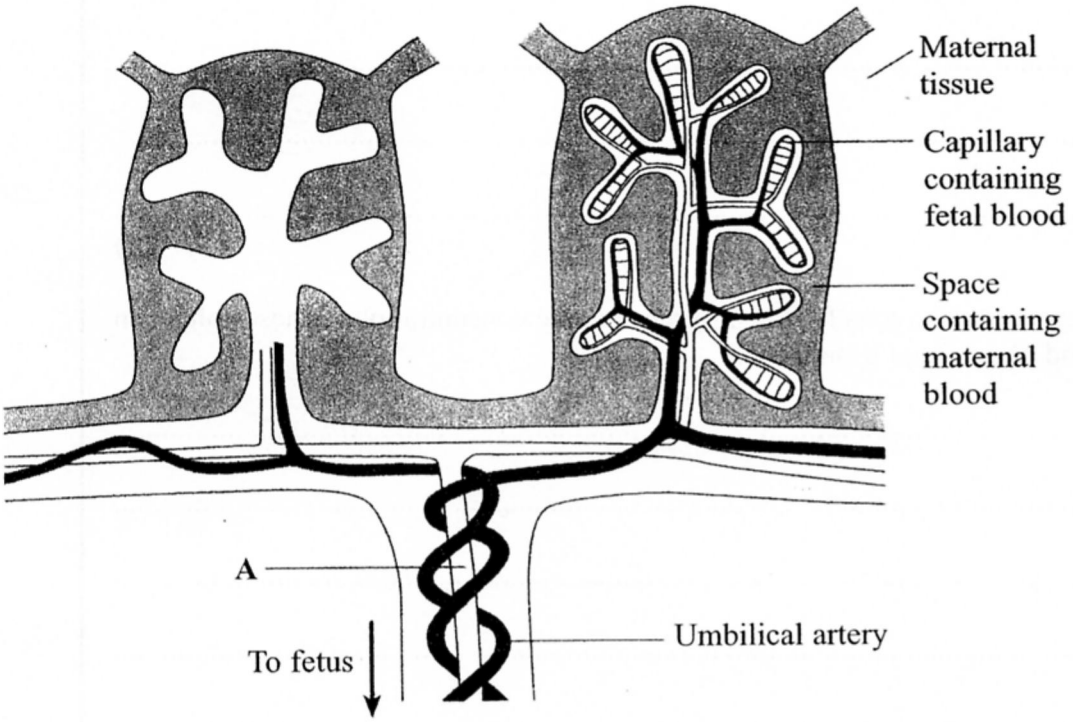
**(2)**

(b) The diagram below shows the structure of part of a human placenta and umbilical cord.




(i) Name the part labelled **A**.

**A** .....

**(1)**

(ii) Name **two** substances which would be present in a higher concentration in the umbilical artery than in the mother's blood.

1. .....

2. .....

**(2)**

(iii) With reference to the diagram, suggest how the structure of the placenta enhances the transfer of substances between the blood of the fetus and the blood of the mother.

*Leave blank*

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**(3)**

(iv) Shortly after the birth of the baby, the placenta leaves the uterus as the afterbirth, as a result of continued contraction of the uterine muscles. Name the hormone that causes this contraction.

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**(1)**

**Q4**

**(Total 9 marks)**

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**5.** Explain what is meant by each of the following terms.

*Leave blank*

(a) Pollination

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**(3)**

(b) Protandry

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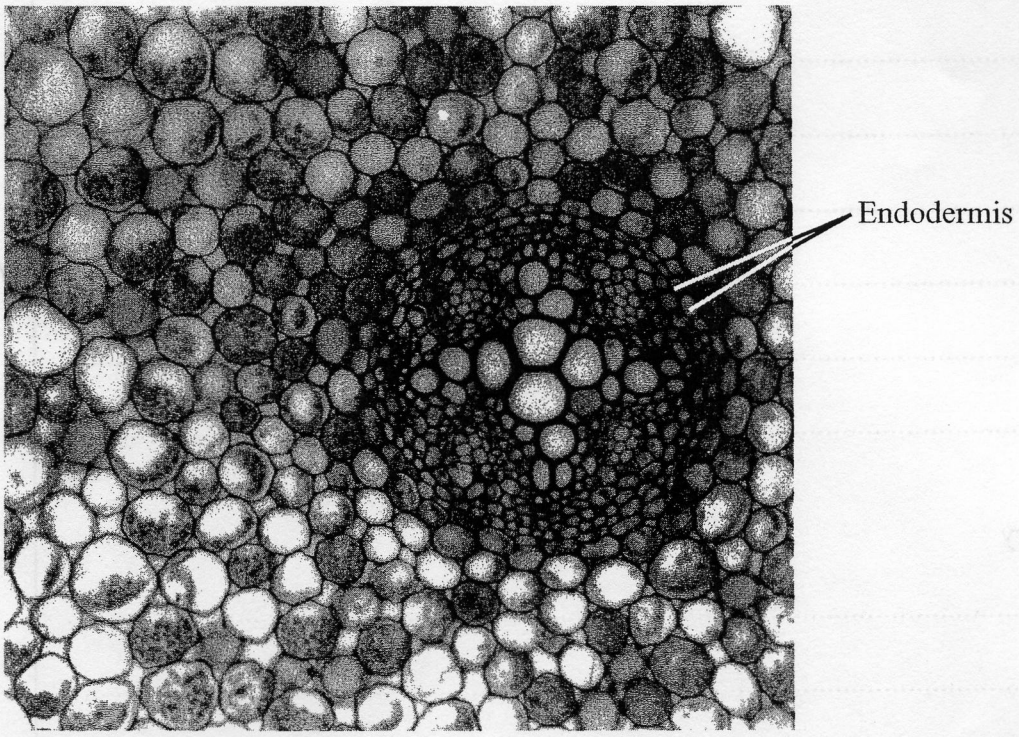
**(2)**

**Q5**

**(Total 5 marks)**

**6.** The photograph below shows a transverse section of part of a root, as seen using a light microscope.

*Leave blank*




(a) On the photograph, label a xylem vessel.

**(1)**

(b) Describe the role of the endodermis.

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**(3)**

(c) In an investigation, the rate of uptake of water by a sunflower was measured at intervals of two hours from 08.00 hours until 06.00 hours on the next day. The results are shown in the table below.

*Leave blank*

| Time (24 hour clock) | Rate of uptake of water / g per 2 hours |
|---|---|
| 08.00 | 3 |
| 10.00 | 12 |
| 12.00 | 29 |
| 14.00 | 38 |
| 16.00 | 39 |
| 18.00 | 40 |
| 20.00 | 12 |
| 22.00 | 9 |
| 24.00 | 8 |
| 02.00 | 5 |
| 04.00 | 2 |
| 06.00 | 2 |

(i) Describe the changes in the uptake of water which occurred during this investigation.

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**(2)**

(ii) Suggest an explanation for the change in the uptake of water which occurred between 08.00 hours and 14.00 hours.

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**(2)**

**Q6**

**(Total 8 marks)**

microscope.

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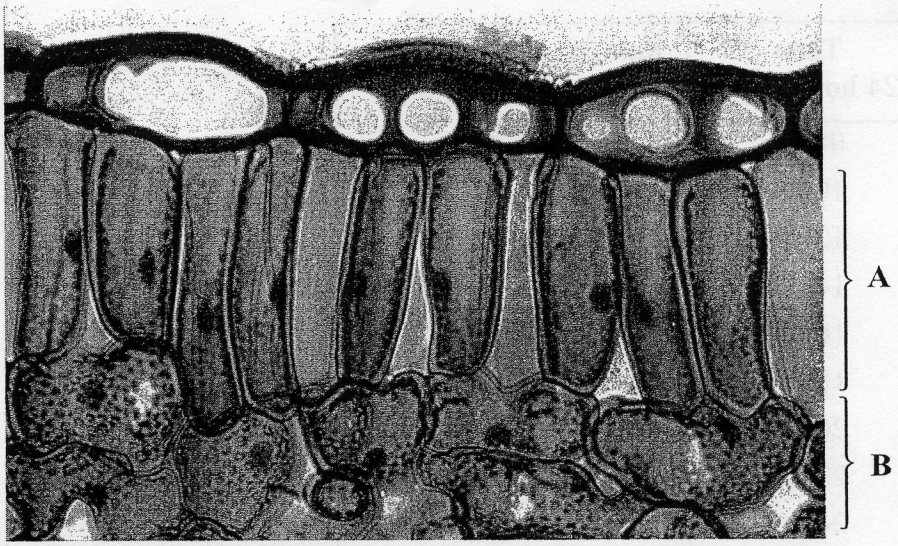


(a) Name the tissues labelled **A** and **B**.

**A** .....

**B** .....

**(2)**

(b) Explain how the tissue labelled **B** is adapted for the function of gas exchange.

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**(3)**

(c) In an investigation into gas exchange in leaves, a maize leaf was placed in a dark chamber, and the mass of carbon dioxide released from the leaf in one hour was determined. The surface area of the leaf was also measured.

*Leave blank*

The results are shown in the table below.

| Mass of carbon dioxide produced per hour /mg | Surface area of leaf /$cm^2$ |
|---|---|
| 4.076 | 29 |

(i) Calculate the mass of carbon dioxide released in one hour per unit area of leaf. Show your working.

Answer .....

**(2)**

(ii) Suggest how the results would have differed if the leaf had been illuminated.

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**(2)**

**Q7**

**(Total 9 marks)**

**8.** The graph below shows the oxygen dissociation curves for the haemoglobin from two species of fish, a toadfish and a mackerel. One of the species is relatively inactive and lives in still water. The other is very active and fast-swimming.

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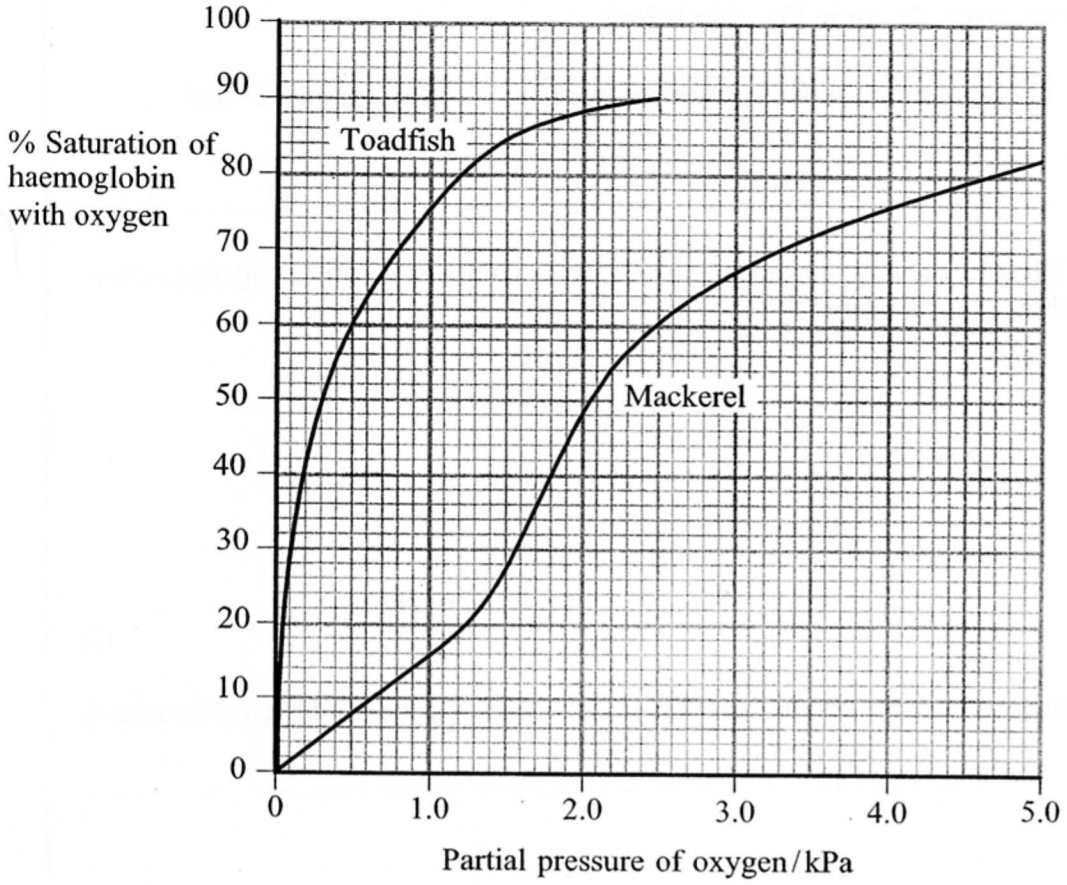


(a) From the graph, find the partial pressure of oxygen at which the haemoglobin of each species of fish is 50% saturated with oxygen.

Toadfish .....

Mackerel .....

**(2)**

(b) Suggest which species of fish is adapted to living in still water. Give an explanation for your answer.

*Leave blank*

Species .....

Explanation .....

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**(4)**

(c) (i) On the graph, sketch a curve to show the effect of an increase in the partial pressure of carbon dioxide (the Bohr effect) on the dissociation curve of mackerel haemoglobin.

**(2)**

(ii) Explain the importance of this effect.

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**(2)**

**Q8**

**(Total 10 marks)**

**9.** Give an account of the process of meiosis and its significance in the production of gametes in humans.

*Leave blank*

*Leave blank*

*Leave blank*

**Q9**

**(Total 10 marks)**

**TOTAL FOR PAPER: 70 MARKS**

**END**