

**Paper Reference 5BI2H/01**

**Edexcel GCSE**

**Biology / Additional Science**

**Unit B2: The Components of Life**

**Higher Tier**

**Monday 10 June 2013 – Afternoon**

**Time: 1 hour plus your additional  
time allowance**

<b>Centre No.</b>					
<b>Candidate No.</b>					
<b>Surname</b>					
<b>Initial(s)</b>					
<b>Signature</b>					
<b>Paper Reference</b>	<b>5</b>	<b>B</b>	<b>I</b>	<b>2</b>	<b>H / 0 1</b>

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**PEARSON**

**2**

## **INSTRUCTIONS TO CANDIDATES**

**In the boxes on page 1 write your centre number, candidate number, your surname, initial(s) and signature. Check that you have the correct question paper.**

**Answer ALL the questions.**

**Answer the questions in the spaces provided – there may be more space than you need.**

## **MATERIALS REQUIRED FOR EXAMINATION**

**Calculator, ruler**

## **ITEMS INCLUDED WITH QUESTION PAPERS**

**Nil**

**(Turn over)**

## **INFORMATION FOR CANDIDATES**

**The total mark for this paper is 60.**

**The marks for EACH question are shown in brackets – use this as a guide as to how much time to spend on each question.**

**Questions labelled with an ASTERISK (\*) are ones where the quality of your written communication will be assessed – you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.**

## **ADVICE TO CANDIDATES**

**Read each question carefully before you start to answer it.**

**Keep an eye on the time.**

**Try to answer every question.**

**Check your answers if you have time at the end.**

**(Turn over)**

4

**Answer ALL questions**

**Some questions must be answered with a cross in a box . If you change your mind about an answer, put a line through the box  and then mark your new answer with a cross .**

**(Turn over)**

**PROTEINS**

**1 Proteins are made up of amino acids.**

**(a) The table shows the DNA bases that code for some of the amino acids found in proteins.**

<b>DNA bases</b>	<b>AAA</b>	<b>AAC</b>	<b>CAA</b>	<b>TAC</b>	<b>TTC</b>
<b>Amino acid</b>	<b>phe</b>	<b>leu</b>	<b>val</b>	<b>met</b>	<b>lys</b>

**Part of the DNA coding for a protein is:**

**T A C C A A T T C**

**(Question continues on next page)**

**(Turn over)**

**6**

- (i) State the order of amino acids coded for by this sequence of DNA. (1 mark)**
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- (ii) These amino acids will be joined together during protein synthesis.**

**During which stage of protein synthesis will this take place? (1 mark)**

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**(Question continues on next page)**

**(Turn over)**

**(iii) Complete the sentence by putting a cross ☒ in the box next to your answer. (1 mark)**

**Amino acids are joined together**

- A at the membrane**
- B in the mitochondria**
- C in the nucleus**
- D at the ribosome**

**(Question continues on next page)**

**(Turn over)**

**(b) DNA can code for the amino acids in the active site of an enzyme.**

**Explain the role of the active site of an enzyme. (2 marks)**

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**(Question continues on next page)**

**(Turn over)**



**(c) Mutations can occur in DNA.**

**Describe what effect a mutation could have on the action of an enzyme. (3 marks)**

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**(Continue your answer on next page)**

**(Turn over)**

**10**

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**(Total for Question 1 = 8 marks)**

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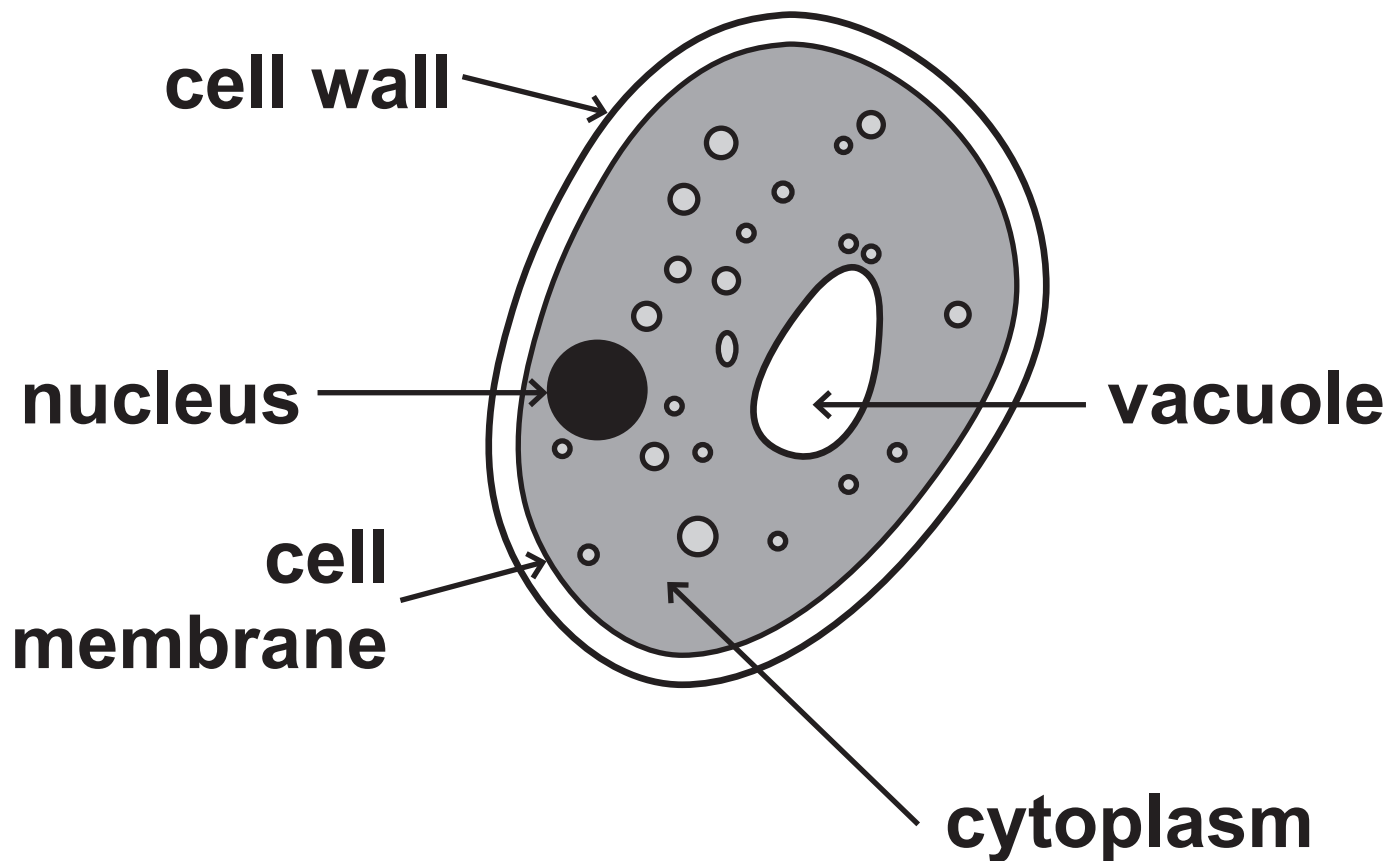
**(Questions continue on next page)**

**(Turn over)**

## CELLS

- 2** Yeasts are microorganisms that are used in the brewing and baking industries.

The diagram shows a yeast cell.



(Question continues on next page)

(Turn over)

**12**

**(a) (i) State TWO ways in which the structure of this yeast cell differs from the structure of a bacterial cell. (2 marks)**

**1**

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**2**

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**(Question continues on next page)**

**(Turn over)**

**13**

**(ii) Plant cells can produce glucose.**

**Suggest why yeast cells cannot produce glucose.  
(1 mark)**

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**(Question continues on next page)**

**(Turn over)**

(b) The table shows the number of different components found in the blood of a healthy person and the blood of two other people.

NUMBER OF COMPONENTS PER $\text{dm}^3$ OF BLOOD			
COMPONENT OF BLOOD	HEALTHY PERSON	PERSON A	PERSON B
red blood cells	$5 \times 10^{12}$	$6 \times 10^{12}$	$3 \times 10^{12}$
white blood cells	$7 \times 10^9$	$5 \times 10^{10}$	$8 \times 10^{10}$
platelets	$3 \times 10^{11}$	$3 \times 10^{11}$	$3 \times 10^{11}$

(Question continues on next page)

(Turn over)

**15**

- (i) Calculate the difference in the number of white blood cells per  $\text{dm}^3$  of blood between the healthy person and person A. (2 marks)**

**answer = \_\_\_\_\_**

**(Question continues on next page)**

**(Turn over)**

**16**

**(ii) Describe the functions  
of white blood cells.  
(2 marks)**

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**(Question continues on next page)**

**(Turn over)**



17

**(iii) Person B has a low number of red blood cells compared to the healthy person.**

**Suggest an effect this may have on person B.  
(1 mark)**

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**(Total for Question 2 = 8 marks)**

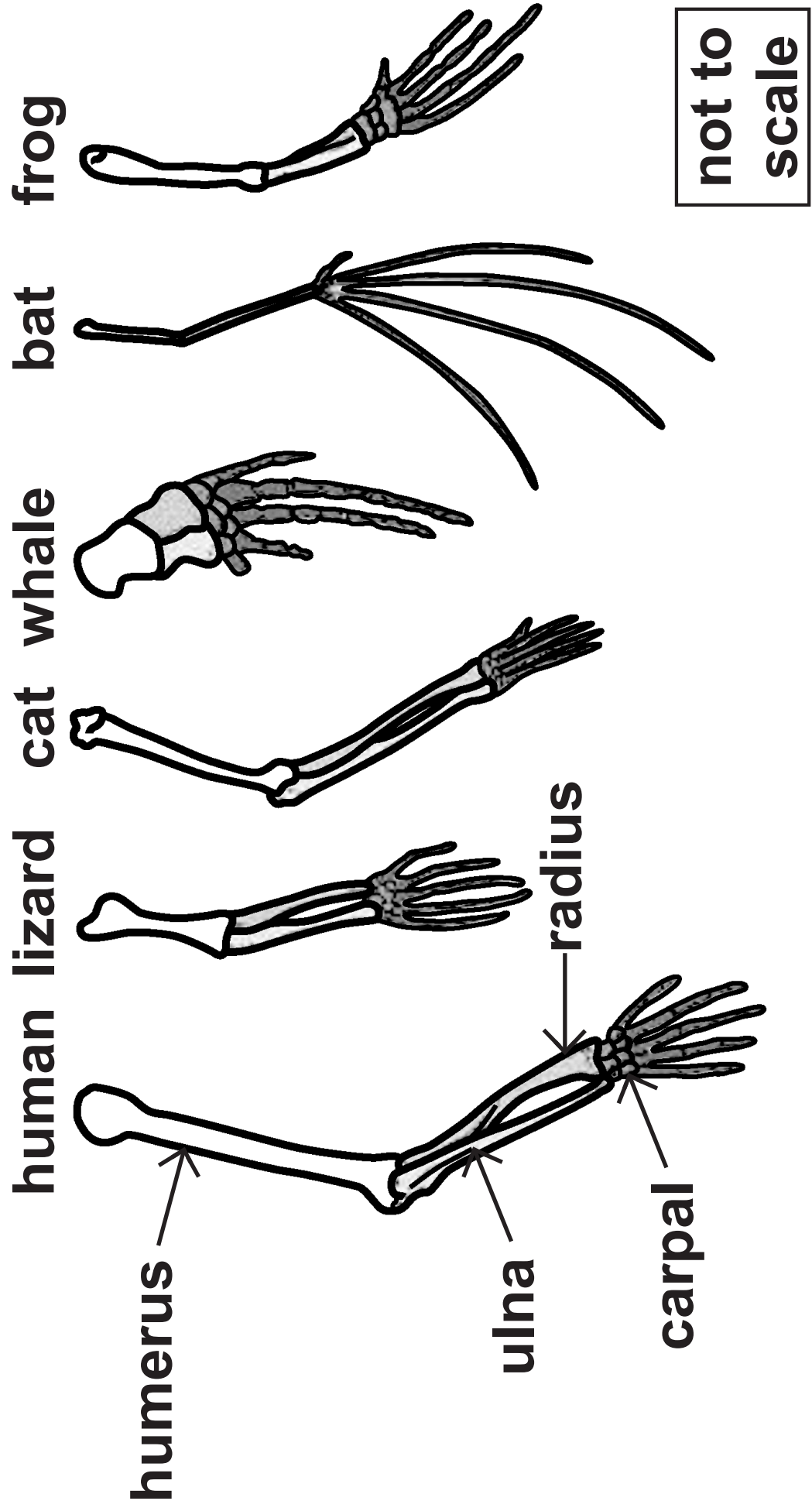
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**(Questions continue on next page)**

**(Turn over)**

# EVIDENCE FOR EVOLUTION

3 The diagrams show the limbs of six organisms.



(Question continues on next page)

(Turn over)

- (a) Many scientists believe that these six organisms evolved from one common ancestor.**

**Describe the evidence shown in the diagrams that supports this belief. (3 marks)**

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**(Continue your answer on next page)**

**(Turn over)**

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**(Question continues on next page)**

**(Turn over)**

**(b) Fossils can provide evidence for evolution.**

**Explain why the fossil record is incomplete. (2 marks)**

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**(Question continues on next page)**

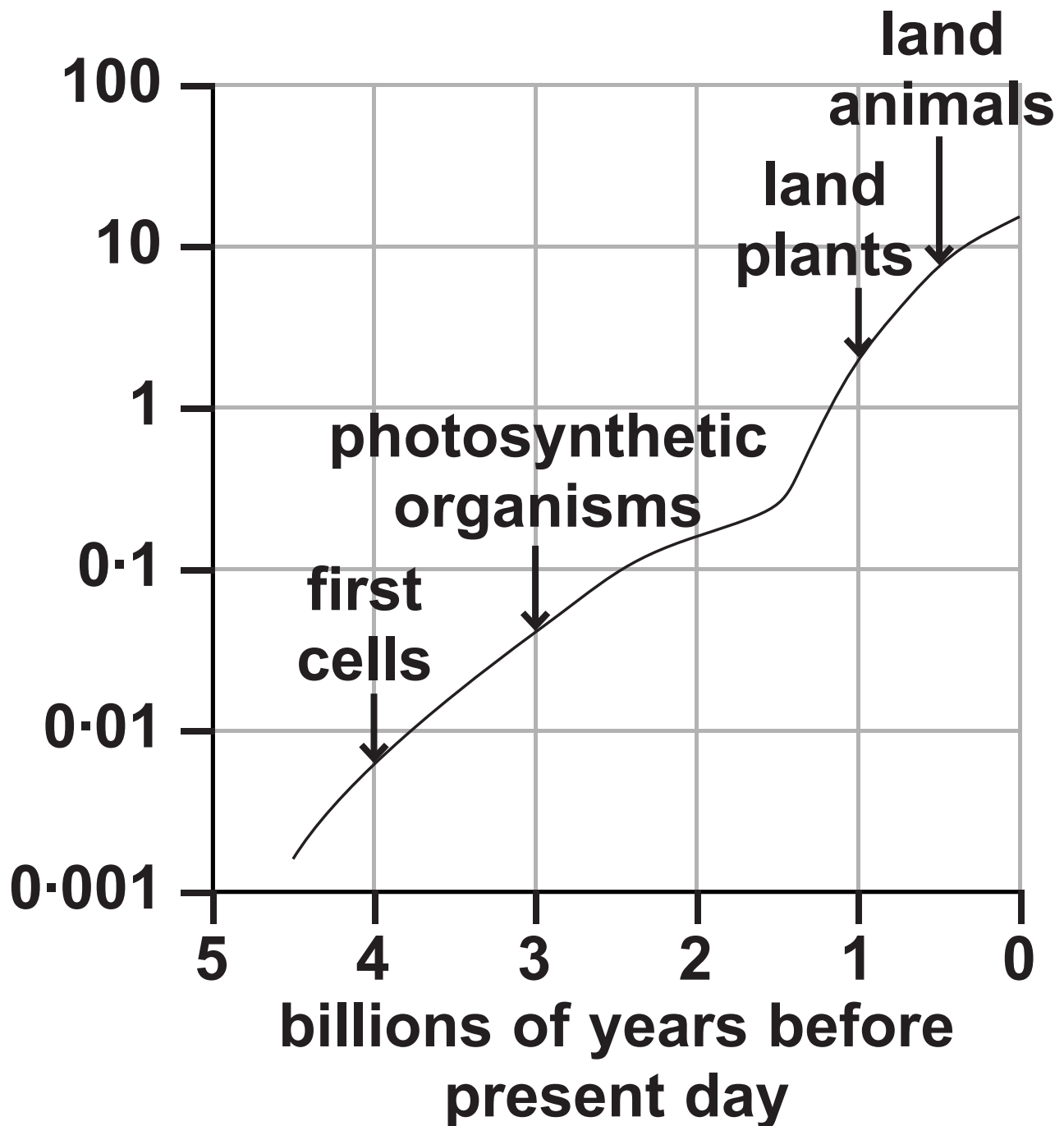
**(Turn over)**

- (c) The graph on page 23 suggests that the level of oxygen in the atmosphere was important for the evolution of many living organisms.**

**(Question continues on next page)**

**(Turn over)**

percentage  
of oxygen in  
atmosphere (%)



(Question continues on next page

(Turn over)

24

- (i) How much oxygen was needed in the atmosphere for the evolution of land animals?

Put a cross  in the box next to your answer.  
(1 mark)

A 0.009%

B 0.09%

C 0.9%

D 9.0%

(Question continues on next page)

(Turn over)



**(ii) Suggest how photosynthesis could have changed the gas content of the atmosphere. (2 marks)**

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**(Question continues on next page)**

**(Turn over)**

**(iii) Suggest why such a high percentage of oxygen in the atmosphere was needed for large land animals to evolve.**

**(2 marks)**

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**(Total for Question 3 = 10 marks)**

**(Questions continue on next page)**

**(Turn over)**

## SEXUAL REPRODUCTION IN CORAL

4 Corals are animals that live on the sea bed.

The photograph shows some species of coral.



(Question continues on next page

(Turn over)

- (a) Corals can reproduce sexually, releasing sperm cells into the water.**

**The mass of DNA in one sperm cell from a species of coral is 0.5 picogram.**

- (i) Suggest the mass of DNA that would be present in an unfertilised egg cell of the same species.  
(1 mark)**
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**(Question continues on next page)**

**(Turn over)**

- (ii) Complete the sentence by putting a cross ☒ in the box next to your answer. (1 mark)

The term used to describe the number of chromosomes in an egg or sperm cell is

- A diploid
- B gamete
- C haploid
- D zygote

(Question continues on next page)

(Turn over)

(iii) Complete the sentence by putting a cross ☒ in the box next to your answer. (1 mark)

The base pairs in DNA are

- A thymine with adenine, cytosine with guanine
- B thymine with guanine, adenine with cytosine
- C uracil with adenine, guanine with cytosine
- D uracil with thymine, guanine with cytosine

(Question continues on next page)

(Turn over)

**(iv) Name the bond that joins the base pairs together.  
(1 mark)**

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**(b) After fertilisation, mitosis takes place to form an embryo.**

**The embryo develops into new coral.**

**(i) Describe mitosis.  
(3 marks)**

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**(Continue your answer on next page)**

**(Turn over)**

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**(ii) Describe how the embryo develops into new coral.  
(3 marks)**

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**(Continue your answer on next page)  
(Turn over)**





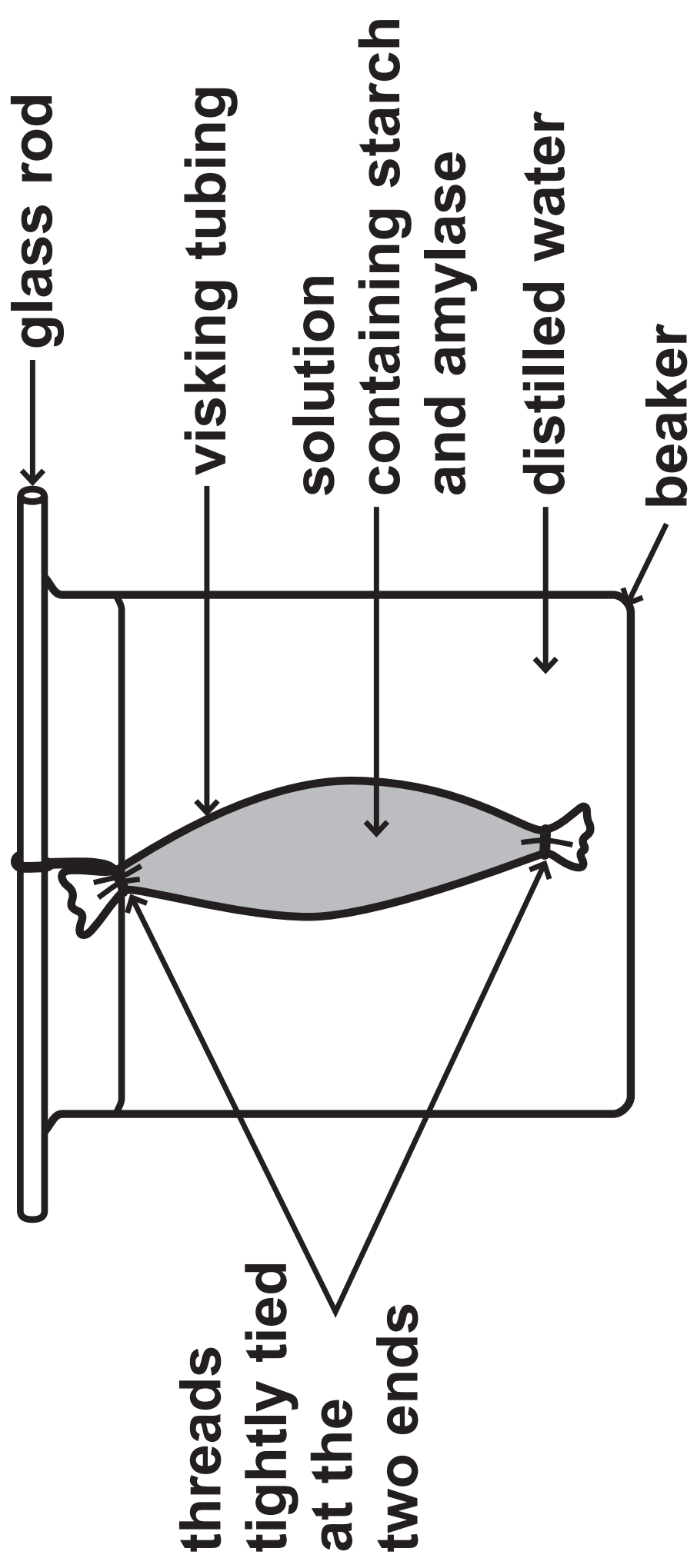
## **USING VISKING TUBING**

- 5 Visking tubing is made of a plastic material through which small molecules can pass.**

**The diagram on page 35 shows how the equipment for an investigation using visking tubing was set up.**

**(Question continues on next page)**

**(Turn over)**



(Question continues on next page)

(Turn over)

- (a) In this investigation, the concentration of glucose in the distilled water was measured at the start and then every five minutes.**

**The results are shown in the table on page 37.**

**(Question continues on next page)**

**(Turn over)**

<b>TIME OF MEASURING THE GLUCOSE CONCENTRATION IN THE DISTILLED WATER / mins</b>	<b>CONCENTRATION OF GLUCOSE IN THE DISTILLED WATER / g cm<sup>-3</sup></b>
0	0-00
5	0-07
10	0-39
15	0-52
20	0-79
25	0-79

**(Question continues on next page)**

**(Turn over)**

**38**

- (i) Describe the results of this investigation.  
(2 marks)**

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**(Question continues on next page)**

**(Turn over)**



**\*(iii) The diagram on page 35 shows how visking tubing can be used to model the small intestine.**

**This model does not fully represent the structure and functions of the small intestine.**

**Evaluate the strengths and weaknesses of this model.  
(6 marks)**

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**(Continue your answer on next page)**

**(Turn over)**





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**(Question continues on next page)**

**(Turn over)**

**(b) Complete the sentence by putting a cross ☒ in the box next to your answer. (1 mark)**

**The function of the gall bladder is to**

- A make bile**
- B make lipase**
- C store bile**
- D store lipase**

**(Total for Question 5 = 12 marks)**

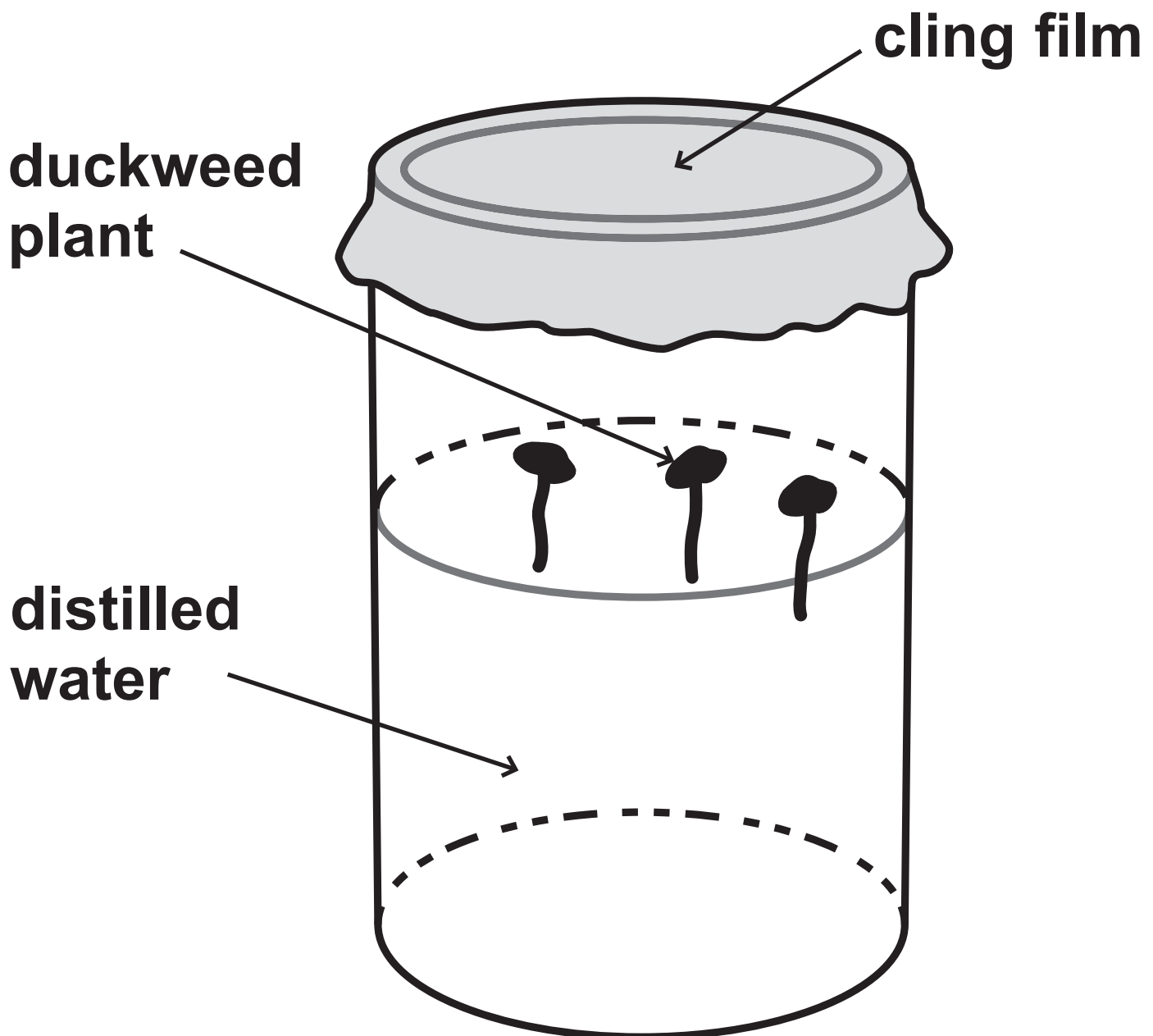
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**(Questions continue on next page)**

**(Turn over)**

**WATER TRANSPORT**

- 6** The diagram shows three duckweed plants in a beaker of distilled water.



**(Question continues on next page)**

**(Turn over)**



- (ii) Salt was added to the water in the beaker to form a salt solution.

**Explain how the salt solution would affect the movement of water into and out of the plant.  
(2 marks)**

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**(Question continues on next page)**

**(Turn over)**

- (iii) Complete the sentence by putting a cross ☒ in the box next to your answer. (1 mark)**

**When the concentration of mineral ions in the soil is greater than in the root hair cell, mineral ions are transported into the root hair cells by**

- A diffusion**
- B osmosis**
- C respiration**
- D transpiration**

**(Question continues on next page)**

**(Turn over)**







**50**

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**(TOTAL FOR QUESTION 6 = 12 MARKS)**

**TOTAL FOR PAPER = 60 MARKS**

**END**