

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Pearson Edexcel
International GCSE (9–1)

Centre Number

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Candidate Number

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Monday 1 June 2020

Afternoon (Time: 1 hour 10 minutes)

Paper Reference **4SS0/1B**

Biology

Unit : 4SS0

Science (Single Award)

Paper: 1B

You must have:

Ruler

Calculator

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- Show all the steps in any calculations and state the units.
- 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 ☒.

Information

- 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.*

Advice

- Read each question carefully before you start to answer it.
- Write your answers neatly and in good English.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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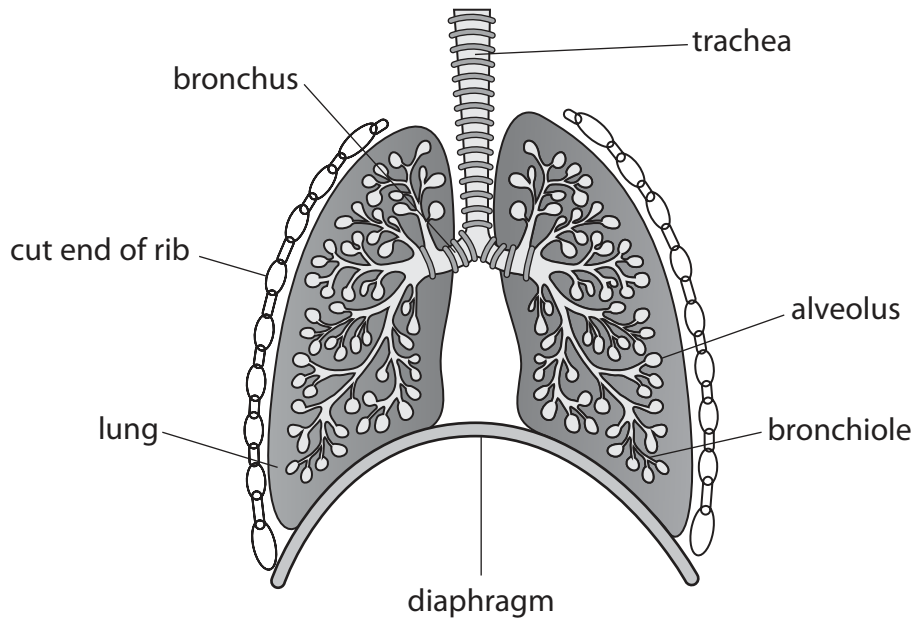



Pearson

Answer ALL questions.

1 The human thorax contains the lungs.

The diagram shows a section through the human thorax.



(a) The diaphragm is made of

(1)

- A** blood
- B** bone
- C** elastic
- D** muscle



(b) Describe the role of the intercostal muscles and the diaphragm when breathing in.

(4)

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(c) Oxygen diffuses into the blood from the alveoli.

The oxygen diffuses a distance of 0.00025 mm.

What is 0.00025 in standard form?

(1)

- A 2.5×10^{-4}
- B 2.5×10^4
- C 25×10^{-4}
- D 25×10^4



- (d) The table gives the total surface area of alveoli and the respiration rate of a cat and of a mouse.

Animal	Total surface area of alveoli in m^2	Respiration rate in cm^3 per minute
cat	10.00	60.0
mouse	0.08	1.0

Explain the relationship between total surface area of alveoli and respiration rate in these animals.

(2)

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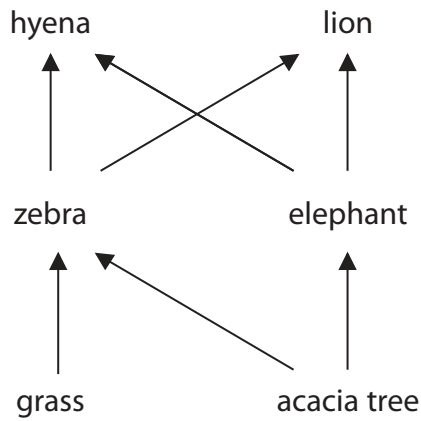
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(Total for Question 1 = 8 marks)



2 The diagram shows a food web for a region in Africa.



(a) Use information from the food web to complete the table.

The first one has been done for you.

(3)

number of plants	2
number of primary consumers	
number of carnivores	
number of food chains	

(b) The flowers of the acacia tree produce nectar.

Give two other features you would expect to find in an acacia flower.

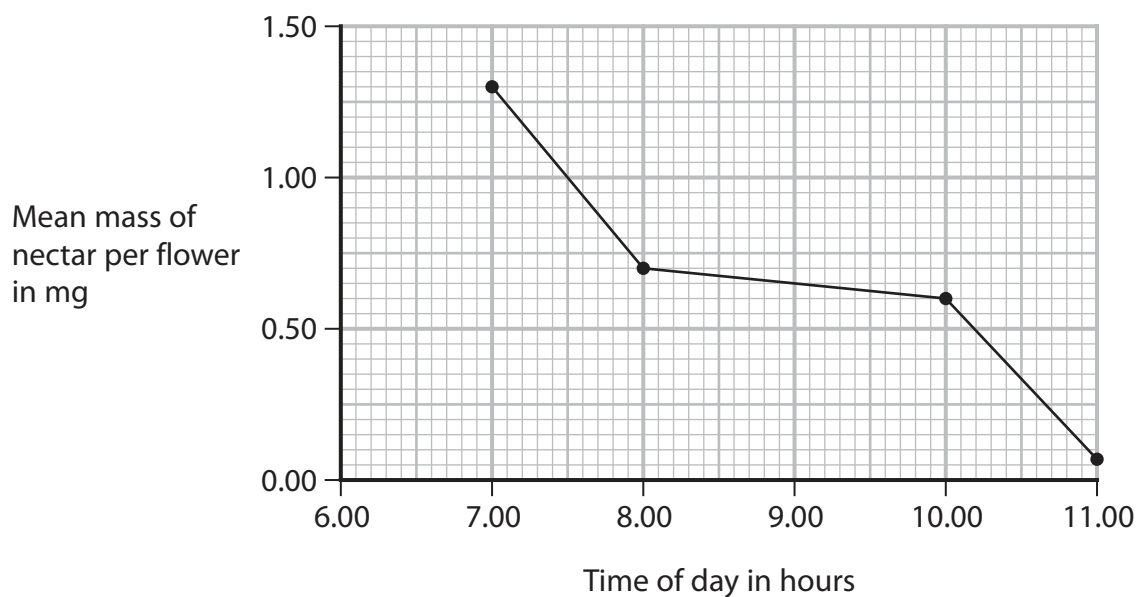
(2)

1

2



- (c) The graph shows the decrease in the mean mass of nectar in flowers during one morning.



- (i) Use the graph to calculate the greatest rate of decrease in the mean mass of nectar.

(2)

greatest rate = mg per hour

- (ii) Give a reason why the mass of nectar decreases during the morning.

(1)

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(d) Acacia flowers produce a chemical that repels ants.

Suggest two advantages for the acacia plant of producing this chemical.

(2)

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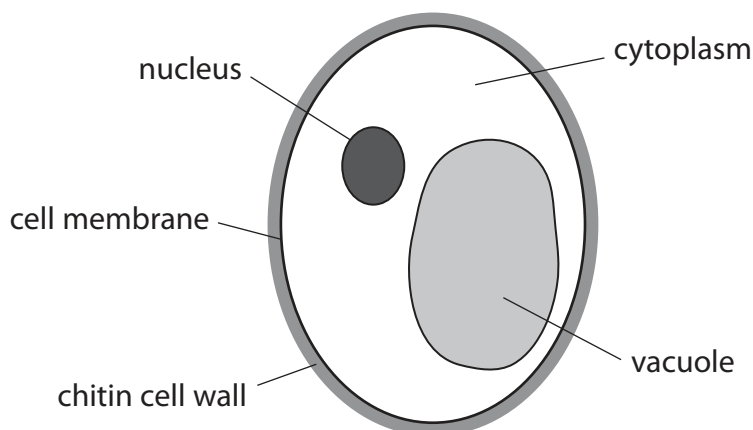
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(Total for Question 2 = 10 marks)



3 Yeast is used to make bread.

The diagram shows a yeast cell.



(a) Give two differences between the structure of a yeast cell and the structure of a plant leaf cell.

(2)

1.....

2.....

(b) A student uses this method to investigate the effect of oxygen on the growth of yeast.

- put 100 cm³ of glucose solution into each of two beakers
- add 0.1 g of yeast to each beaker
- bubble sterile oxygen into one beaker and sterile nitrogen into the other beaker
- after 24 hours, take three samples from each beaker
- observe these samples using a microscope
- count the number of yeast cells in one field of view for each sample

The table shows the student's results.

Sample	Number of yeast cells	
	glucose solution with oxygen	glucose solution with nitrogen
1	20	17
2	25	14
3	22	11



(i) Explain the student's results.

(2)

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(ii) The oxygen and nitrogen are sterilised to remove micro-organisms.

Suggest why micro-organisms need to be removed from these gases.

(2)

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(iii) The student controls these variables in his investigation.

- the volume of glucose solution
- the mass of yeast
- the time of sampling

Give three other variables he needs to control.

(3)

1

2

3

(iv) Comment on the reliability of the student's data.

(1)

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(Total for Question 3 = 10 marks)

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4 Human saliva contains amylase.

A student thinks that salty food might affect the ability of amylase to digest starch.

Design an investigation to find out if salt affects the ability of amylase to digest starch.

Include experimental details in your answer and write in full sentences.

(6)

Area with horizontal dotted lines for writing the answer.

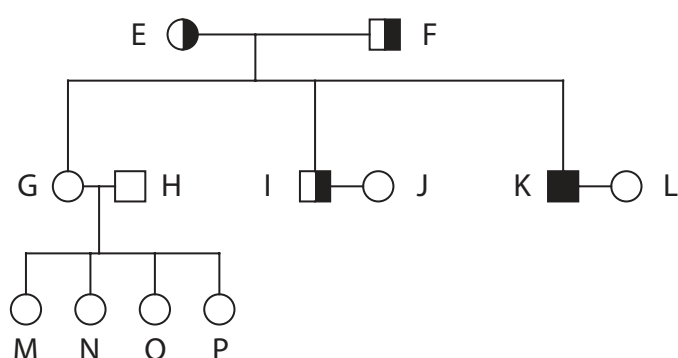
(Total for Question 4 = 6 marks)



5 Alkaptonuria is a condition that causes people to produce black urine.

This condition is caused by a recessive allele.

The diagram shows the inheritance of alkaptonuria in a family.



Key

- unaffected female
- ◐ carrier female (heterozygous)
- affected female
- unaffected male
- ◑ carrier male (heterozygous)
- affected male

(a) (i) How many people in this family have alkaptonuria?

(1)

- A one
- B three
- C four
- D eight

(ii) How many people in this family are homozygous?

(1)

- A one
- B three
- C eight
- D nine

(iii) What is the probability of parents I and J having a child who is a carrier?

(1)

- A 0.0
- B 0.25
- C 0.5
- D 1.0



(iv) Give the probability of two carrier parents having a female child with alkaptonuria.

(1)

probability =

(b) There are 500 000 people in the world with alkaptonuria but only 64 of these people live in the United Kingdom.

Calculate the percentage of people with alkaptonuria that live in the UK.

(2)

percentage = %

(c) Alkaptonuria can prevent heart valves from working properly.

Explain how this would affect the ability of a person to exercise.

(3)

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(Total for Question 5 = 9 marks)

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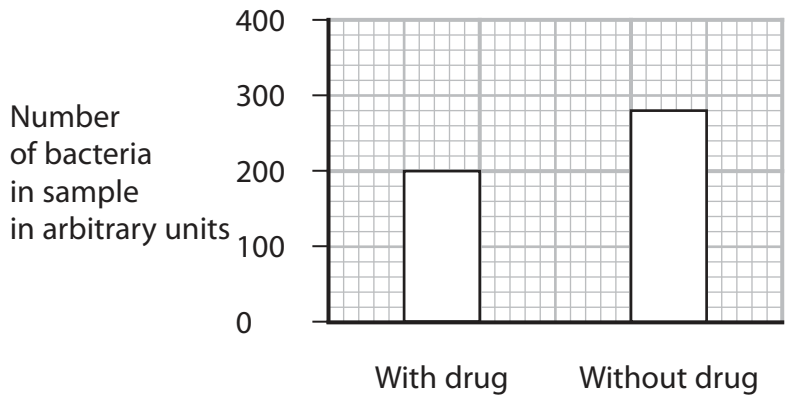
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6 A scientist investigates if a drug can help the immune system.

The scientist measures the activity of phagocytes with the drug and without the drug.

The graph shows the scientist's results.



The scientist claims the results prove the drug helps white blood cells defend the body against diseases.

Comment on the scientist's claim.

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(Total for Question 6 = 4 marks)



7 Faeces contain undigested food.

(a) The table shows the percentage of different substances in a dry sample of faeces.

Substance	Percentage in dry sample of faeces (%)
carbohydrate	30
fat	20
protein	3

(i) Name a carbohydrate that could be found in faeces. (1)

(ii) Describe how you would test the sample of faeces for fat. (2)

(iii) State the five chemical elements that could be present in protein. (1)



(b) Grass is eaten by many animals.

Diagram 1 shows a grass cell.

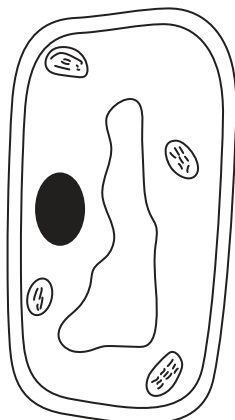


Diagram 1

Diagram 2 shows this grass cell in the faeces of an animal.

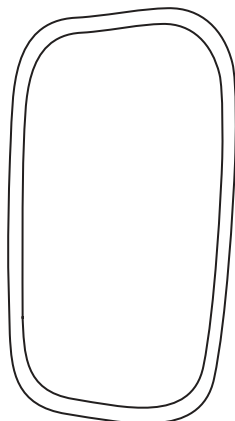


Diagram 2

Explain the difference in the appearance of these grass cells.

(3)

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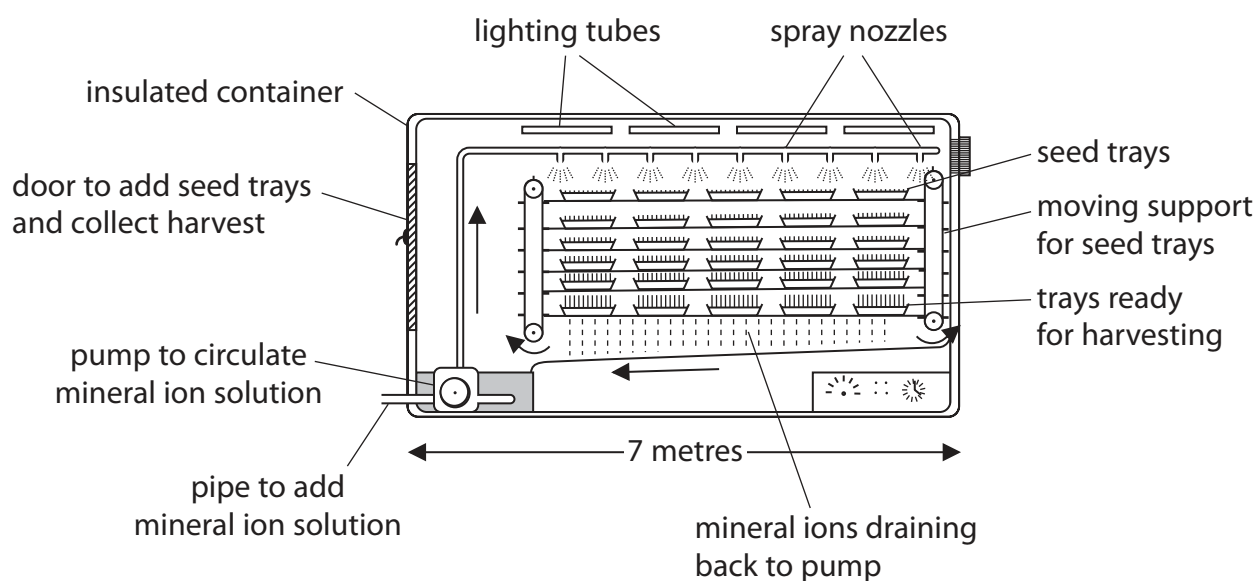
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(c) The diagram shows a section through a building that has been designed to grow grass indoors.



This is the method used to grow grass in the building.

- wash and sterilise empty trays
- fill these trays with soil containing grass seeds
- put these trays in the building
- spray mineral ion solution on to the soil in the trays
- provide light and keep the temperature at 20°C
- collect the grass after a week and feed to animals



1000 kg of grass can be grown every day using this method.

A farmer would need to use several fields to grow this mass of grass every day outdoors.

The farmer decides to grow grass in the building to feed his animals, rather than letting them eat grass from his fields.

Discuss this decision.

(6)

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(Total for Question 7 = 13 marks)

TOTAL FOR PAPER = 60 MARKS



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