PEARSON EDEXCEL IGCSE BIOLOGY · 4BI1

BIOLOGY



EXAM QUESTION PACK

SECTION 2: STRUCTURE AND FUNCTIONS IN LIVING ORGANISMS (PACK 4)

SCORE	PERCENTAGE
/59	%

STEMUP

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Q1.

Some cosmetic companies claim that adding argan oil to their shampoo increases the strength of human hair.

Design an investigation to find out if argan oil shampoo does increase the strength of human hair.

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

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(Total for question = 6 marks)

Q2.

A study investigates the effect of training on athletic performance.

In the study, the number of capillaries in the muscle tissue of a person is measured before and after a six-week period of training.

(a) The table shows the results.

Mean number of capillaries per mm²	
before training	after training
437	460

(i) Explain how training may affect the athletic performance of this person.

Use information from the table to support your answer.

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(ii) Give **two** ways in which the design of the study could be improved.

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(b) The diameter of a capillary is 8.0 µm and the diameter of the aorta is 25.0 mm. 1000 µm = 1 mm

(i) Calculate the ratio of the diameter of the aorta to the diameter of the capillary.

Show your working.

(2)

ratio = ...

(ii) Explain why the aorta has a thicker wall than the capillary.

(2)

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(Total for question = 11 marks)

Q3.

A study investigates the effect of training on athletic performance.

In the study, the number of capillaries in the muscle tissue of a person is measured before and after a six-week period of training.

(a) The table shows the results.

Mean number of capillaries per mm²	
before training	after training
437	460

(i) Explain how training may affect the athletic performance of this person.

Use information from the table to support your answer.

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(b) The diameter of a capillary is 8.0 µm and the diameter of the aorta is 25.0 mm. 1000 µm = 1 mm

(i) Calculate the ratio of the diameter of the aorta to the diameter of the capillary.

Show your working.

(2)

ratio = ...

(ii) Explain why the aorta has a thicker wall than the capillary.

(2)

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(Total for question = 11 marks)

Q4.

Describe an experiment you could carry out to determine the effect of pH on the rate of digestion by amylase.

Your answer should include experimental details and be written in full sentences.

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(Total for question = 6 marks)

Q5.

Describe an experiment you could carry out to determine the effect of pH on the rate of digestion by amylase.

Your answer should include experimental details and be written in full sentences.

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(Total for question = 6 marks)

Q6.

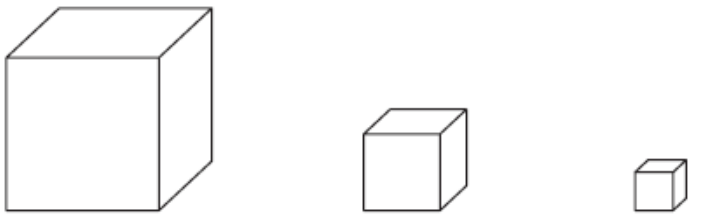
A student uses this method to investigate the movement of molecules by diffusion.

- cut three different sized cubes, A, B, and C, from a block of clear agar jelly

cube A has sides 2 cm × 2 cm × 2 cm

cube B has sides 1 cm × 1 cm × 1 cm

cube C has sides 0.5 cm × 0.5 cm × 0.5 cm



- place each cube in a beaker of red dye solution for five minutes
- remove the cubes from the dye solution
- wash the surface of each cube with water and dry with filter paper
- cut each cube in half and examine the newly cut surfaces

(a) State what is meant by the term **diffusion**.

(1)

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(b) Give two factors that the student should control in their investigation.

(2)

1 .....

2 .....

(c) The table gives some information about cubes A, B and C.

Cube	Side in cm	Surface area in cm^2	Volume in cm^3	Surface area to volume ratio
A	2.0		8.0	
B	1.0	6.0	1.0	6:1
C	0.5	1.5	0.125	12:1

(i) Calculate the surface area of cube A.

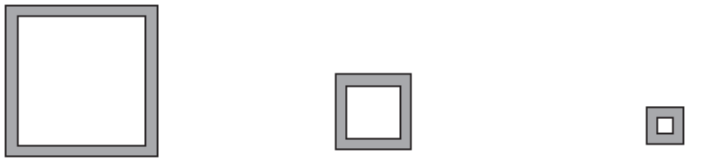
(2)

surface area = ... cm^2

(ii) Complete the table by calculating the surface area to volume ratio for cube A.

(1)

(iii) The diagram shows the newly cut surfaces of the cubes.



cube A cube B cube C

Using a ruler, determine the distance the red dye has diffused into the cubes.

(1)

distance = ... mm

(iv) Using the data from the table and your measurement from (c)(iii), comment on the effect of size on transport in an organism.

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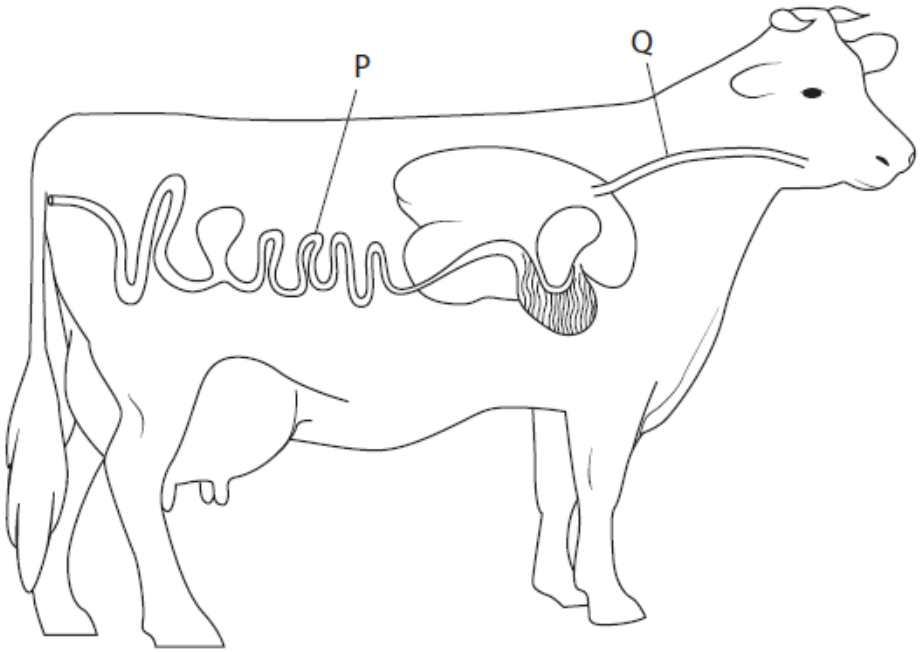
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(Total for question = 11 marks)

Q7.

The diagram shows part of the digestive system of a cow.



(a) Name the parts labelled P and Q.

(2)

P .....

Q .....

(b) The cow's stomach contains microorganisms that digest plant cell walls.

Suggest why these microorganisms are useful to a cow.

(2)

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(c) Farmers keep cows to produce milk.

Injecting cows with growth hormone (GH) will increase milk production.

This allows farmers to obtain the same volume of milk from fewer cows.

Digestion in cows releases methane gas into the atmosphere.

A scientist claims that injecting GH into cows would reduce climate change.

Comment on this claim.

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(Total for question = 8 marks)