PEARSON EDEXCEL GCSE BIOLOGY (HIGHER) · 1BI0

BIOLOGY



EXAM QUESTION PACK

TOPIC 1: KEY CONCEPTS IN BIOLOGY (PACK 2)

SCORE	PERCENTAGE
/64	%

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Q1.

Gregor Mendel used pea plants in plant breeding experiments. He discovered the basis of genetic inheritance.

Peas contain small amounts of fat.

Describe a test to identify fat.

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(Total for question = 2 marks)

Q2.

A student was investigating mitosis in the roots of a garlic plant.

Describe how the student could prepare a microscope slide to show mitosis in the growing roots of a garlic plant.

(4)

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(Total for question = 4 marks)

Q3.

Figure 13 shows a sperm cell.

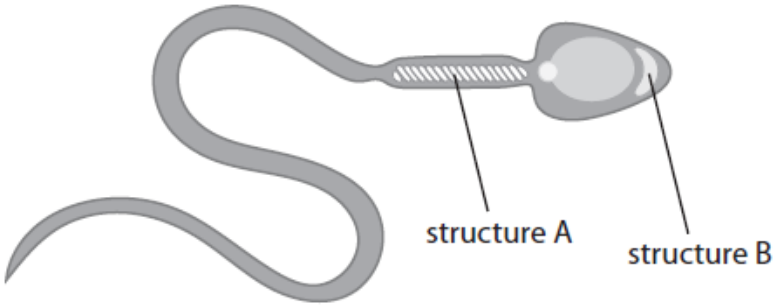


Figure 13

Describe how structure A and structure B enable fertilisation.

(2)

structure A

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structure B

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(Total for question = 2 marks)

Q4.

Figure 2 shows a calorimeter.

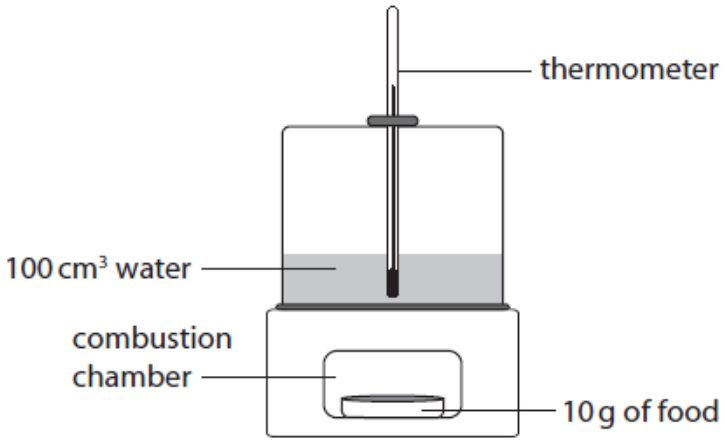


Figure 2

Describe how this calorimeter can be used to find the energy content of 10 g of food.

(3)

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(Total for question = 3 marks)

Q5.

A student placed a prepared slide on the stage of a light microscope.

Describe how to adjust the microscope to view the slide at a magnification of ×400.

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(Total for question = 2 marks)

Q6.

Figure 2 shows a banana plantation.



© warmer/Shutterstock

Figure 2

After the bananas have been harvested, the old plants are cut down.

The suckers then develop into mature plants producing the next crop of bananas.

The tip of each sucker contains a group of cells called a meristem.

(i) Describe the function of a meristem in the growth of a plant.

(2)

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(ii) A student took a sample of cells from a meristem to view under a light microscope.

Describe how the student would prepare a microscope slide using these cells.

(3)

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(Total for question = 5 marks)

Q7.

Crop plants provide a source of energy in the form of carbohydrates such as starch and sugars.

(i) Describe the test to identify starch.

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(ii) The amount of energy in the sugars extracted from crop plants can be measured using the calorimeter shown in Figure 9.

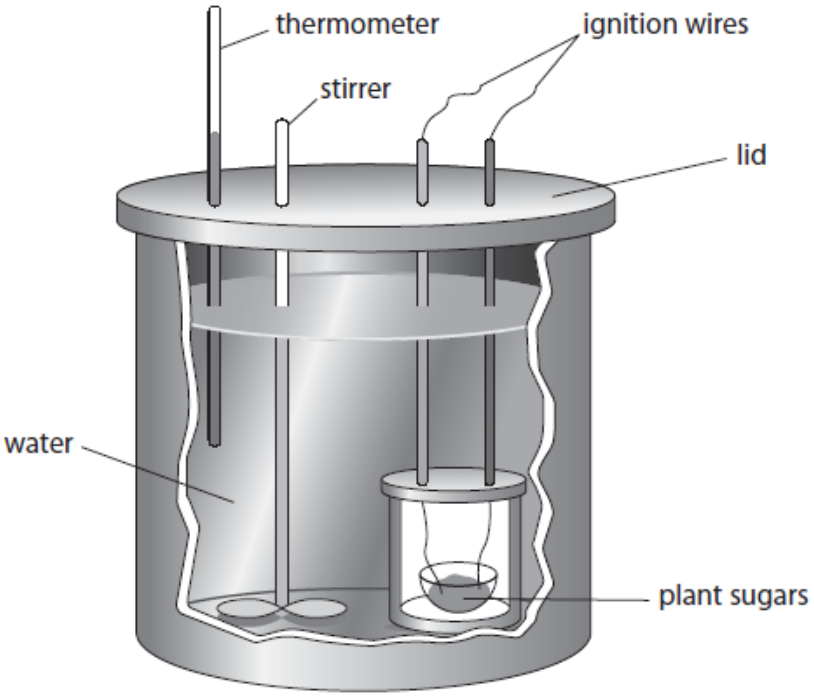


Figure 9

Explain why the calorimeter has a lid.

(2)

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(iii) State why it is important to stir the water in the calorimeter.

(1)

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(Total for question = 5 marks)

Q8.

Amylase has an optimum pH of 6.8.

Devise a method the students could use to confirm the optimum pH for amylase.

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(Total for question = 3 marks)

Q9.

Devise a method to find the optimum temperature for the enzyme lactase.

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(Total for question = 3 marks)

Q10.

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

Food is moved through the digestive system by

(1)

☒ **A** diffusion

☒ **B** digestion

☒ **C** peristalsis

☒ **D** active transport

(b) State **two** roles of bile in digestion.

(2)

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2 .....

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*(c) Describe the roles of the enzymes involved in digestion.

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(d) Explain how the structure of the villi allows efficient absorption in the small intestine.

(3)

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(Total for Question is 12 marks)

Q11.

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

Food is moved through the digestive system by

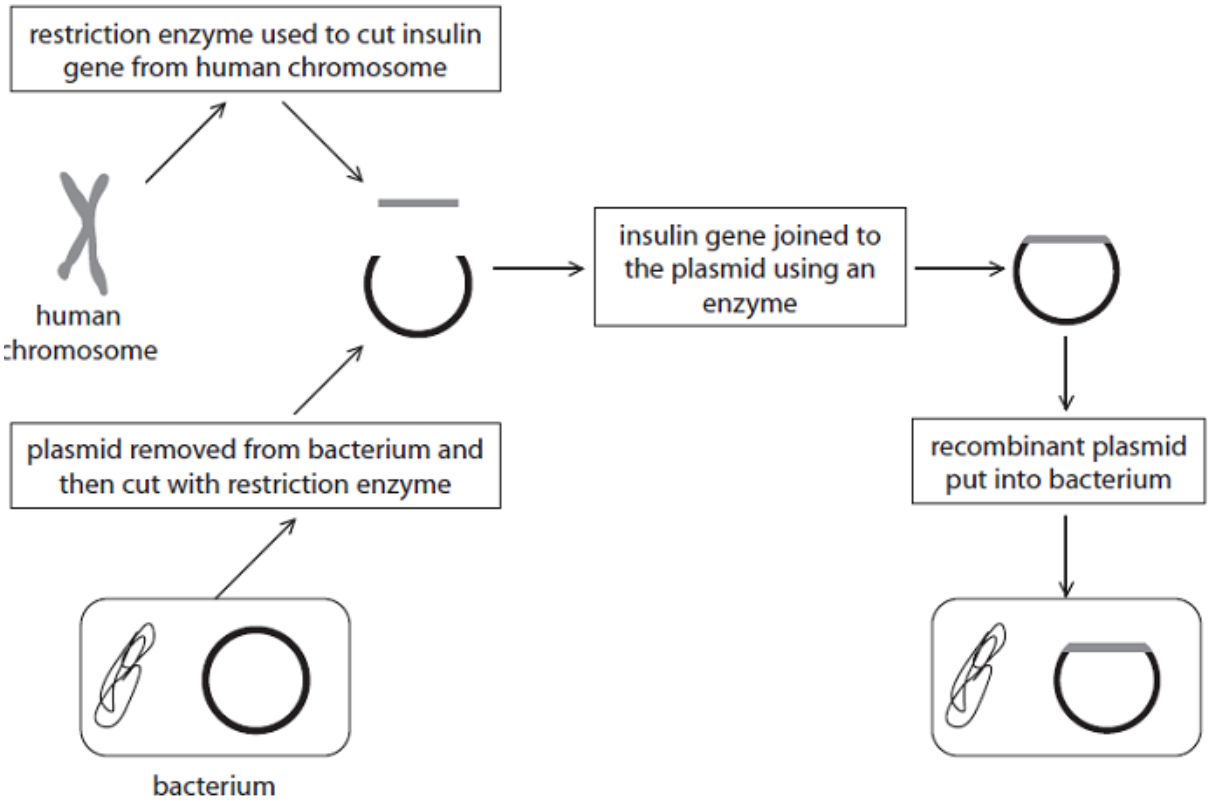
(1)

- ☒ **A** diffusion
- ☒ **B** digestion
- ☒ **C** peristalsis
- ☒ **D** active transport

Q12.

Enzyme technology

The diagram shows how the human insulin gene can be used to genetically modify bacteria.



(a) (i) Name the enzyme used to join the insulin gene to the plasmid.

(1)

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(ii) Suggest why the same restriction enzyme was used to cut the human chromosome and the plasmid.

(2)

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*(b) Enzyme technology can be used in the production of foods including sweets, vegetarian cheese and lactose-free milk.

Describe how enzyme technology can be used to produce these food products.

(6)

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(c) Washing powders can be biological or non-biological.

Describe how biological washing powders can make clothes cleaner than nonbiological washing powders.

(2)

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(Total for question = 11 marks)

Q13.

Enzymes

DNA and RNA are involved in the synthesis of proteins such as enzymes.

(a) Protein synthesis involves transcription and translation.

Which row shows the molecules involved in both transcription and translation?

Place a cross (☒) in the box next to your answer.

(1)

	transcription	translation
☐ **A**	tRNA	tRNA
☐ **B**	mRNA	DNA
☐ **C**	tRNA	DNA
☐ **D**	mRNA	mRNA

(b) Describe what happens to the molecule produced by transcription before it is translated.

(2)

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(c) Explain how the lock and key hypothesis models how enzymes work.

You may use labelled diagrams in your answer.

(3)

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*(d) Describe how named factors affect the rate of enzyme-catalysed reactions.

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(Total for question = 12 marks)

Q14.

* A student investigated the movement of water.

Hens' eggs were placed in vinegar for two days to dissolve the shell.

This makes the eggs permeable to water.

The eggs were then weighed and placed in different solutions.

After 24 hours the eggs were weighed again.

Figure 15 shows the results.

solution	mass of the egg at the start in grams	mass of the egg after 24 hours in grams
tap water	77	84
5% salt	77	77
10% salt	77	75

Figure 15

Evaluate the results of this investigation.

You should include calculations using the data in Figure 15.

(6)

(Total for question = 6 marks)

Q15.

Some students investigated the effect of sucrose concentration on the change in mass of beetroot chips.
A beetroot chip was weighed, immersed in water for 30 minutes and then reweighed.
This was repeated using five more beetroot chips and five different concentrations of sucrose solution.
The results are shown in Figure 8.

chip	concentration of sucrose solution mol per dm^{-3}	starting mass of beetroot chip in grams	end mass of beetroot chip in grams
1	0.0 (water)	2.56	3.89
2	0.2	2.47	2.88
3	0.4	1.99	2.00
4	0.6	2.30	2.12
5	0.8	2.15	1.84
6	1.0	2.22	1.62

Figure 8

* A student set up an experiment to investigate osmosis as shown in Figure 9.

The student used visking tubing which is a partially permeable membrane.

The student put 25 cm^3 of 20% sucrose solution into visking tube 1 and 25 cm^3 of distilled water into visking tube 2.

Both tubes were placed in a 5% sucrose solution and left for 1 hour.

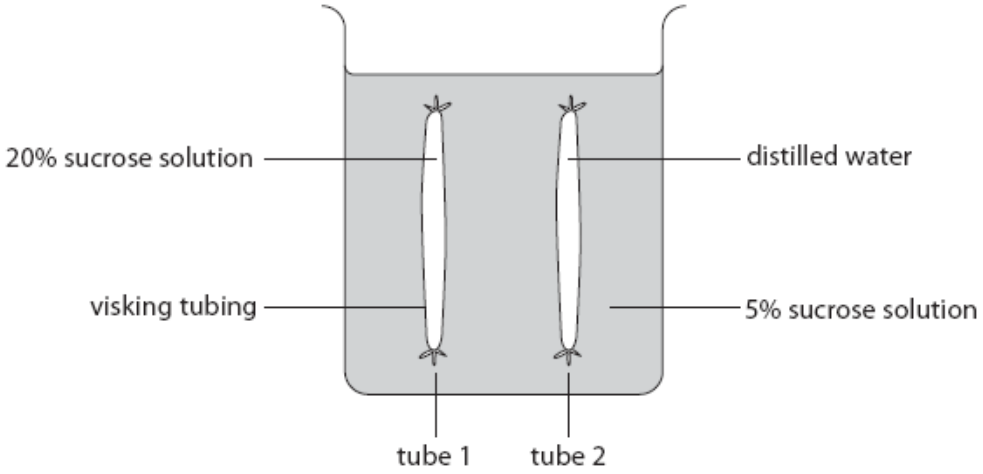


Figure 9

Explain how and why tube 1 and tube 2 would look different after one hour.

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(Total for question = 6 marks)