

New
Specification

General Certificate of Secondary Education
2012

Centre Number

71

Candidate Number

Biology

Unit 1

Foundation

[GBY11]



WEDNESDAY 30 MAY, AFTERNOON

TIME

1 hour 15 minutes.

INSTRUCTIONS TO CANDIDATES

Use blue or black ink.

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Answer **all twelve** questions in the spaces provided.

INFORMATION FOR CANDIDATES

The total mark for this paper is 80.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in questions **4**, **8(a)** and **12**.

For Examiner's
use only

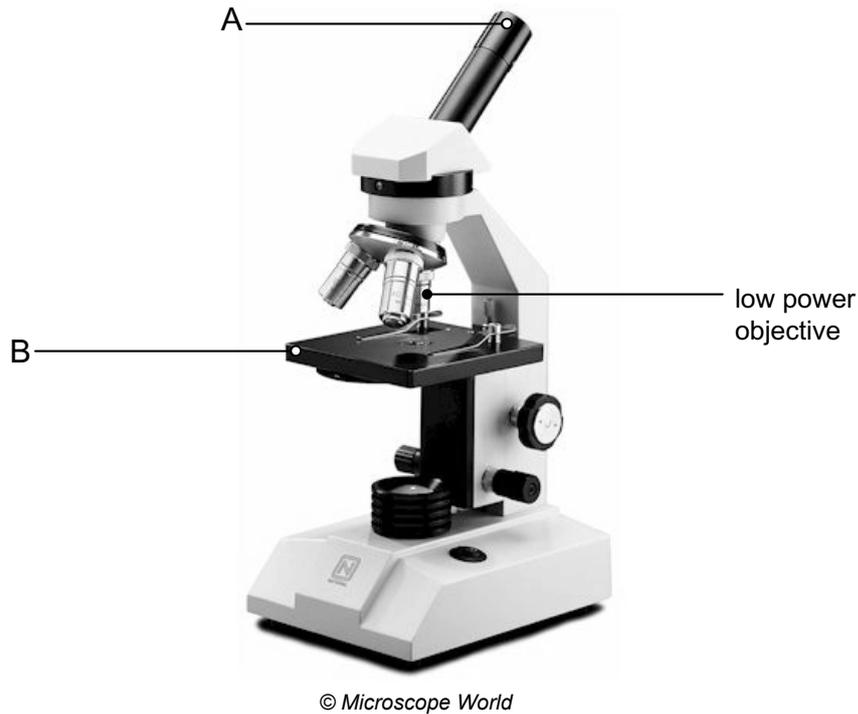
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

Total
Marks

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1 The diagram shows a microscope which can be used to examine cells.



(a) Name parts A and B.

A _____ [1]

B _____ [1]

(b) Why is the low power objective always used first when focusing on cells on the microscope slide?

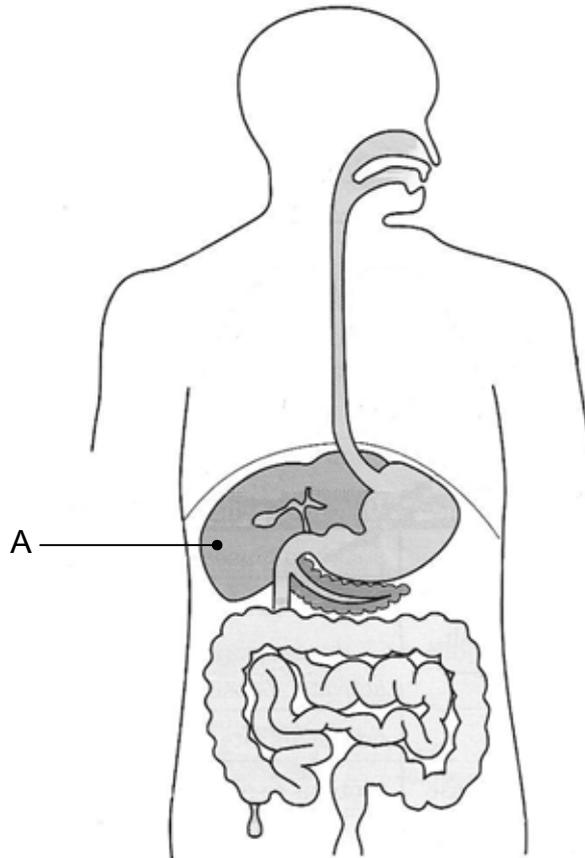
 _____ [1]

(c) What else must be adjusted to get a clear view of these cells?

 _____ [1]

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Marks	Remark

2 The diagram shows part of the human digestive system.



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(a) Name part A. _____ [1]

The stomach contains gastric juice.

(b) Name **two** substances found in gastric juice.

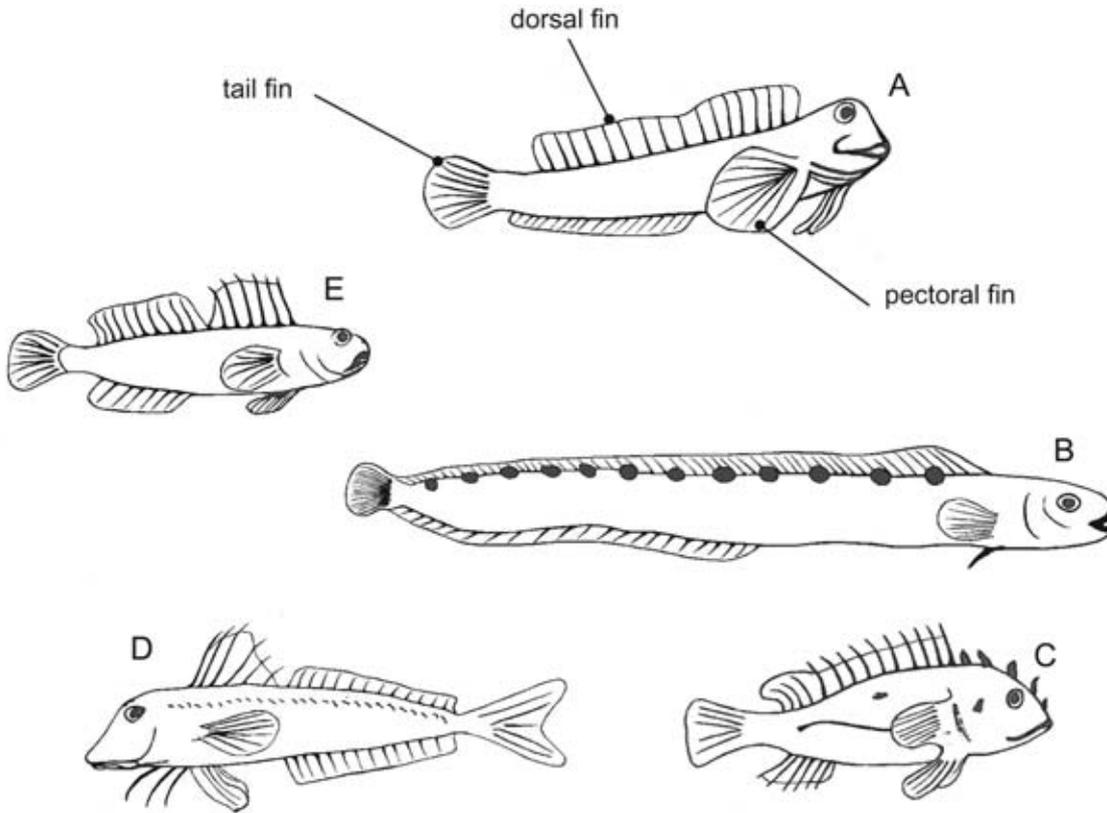
_____ and _____ [2]

(c) Describe how the colon is adapted for water absorption.

_____ [1]

Examiner Only	
Marks	Remark

3 The drawings show five fish.



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Marks	Remark

(a) Use the key to identify the Goby, Blenny and Butterfish.

Place the correct letter in each box.

- 1. Dorsal fin split into two parts. go to 2
 Dorsal fin not split into two parts. go to 3
- 2. End of tail V-shaped. *Gurnard*
 End of tail not V-shaped. *Goby*
- 3. Pectoral fin as wide as body. *Blenny*
 Pectoral fin not as wide as body. go to 4
- 4. Dorsal fin joined to tail fin. *Butterfish*
 Dorsal fin not joined to tail fin. *Scorpion fish*

[3]

(b) Use the key to give **one** feature found in both the Butterfish and the Scorpion fish but not in the Blenny.

[1]

(c) Explain why size cannot be used to identify the fish in the key.

[1]

Examiner Only	
Marks	Remark

5 (a) Complete the table by

- adding **two** column headings,
- naming **one** reagent,
- describing **three** colour changes.

	Colour before food test		
Iodine	Yellow/brown		[2]
Benedict's		Brick red precipitate	[1]
Biuret	Blue		[1]
	Clear	White emulsion	[1]

Three of the reagents were used to carry out tests on three foods A, B and C.

The results are shown in the table below.

✓ = positive result ✗ = negative result

Food tested	Reagent		
	Iodine	Benedict's	Biuret
A	✓	✓	✗
B	✗	✓	✓
C	✓	✗	✓

(b) (i) Which of the foods tested contain starch?

_____ [1]

(ii) Which of the foods tested contains **both** sugar and protein?

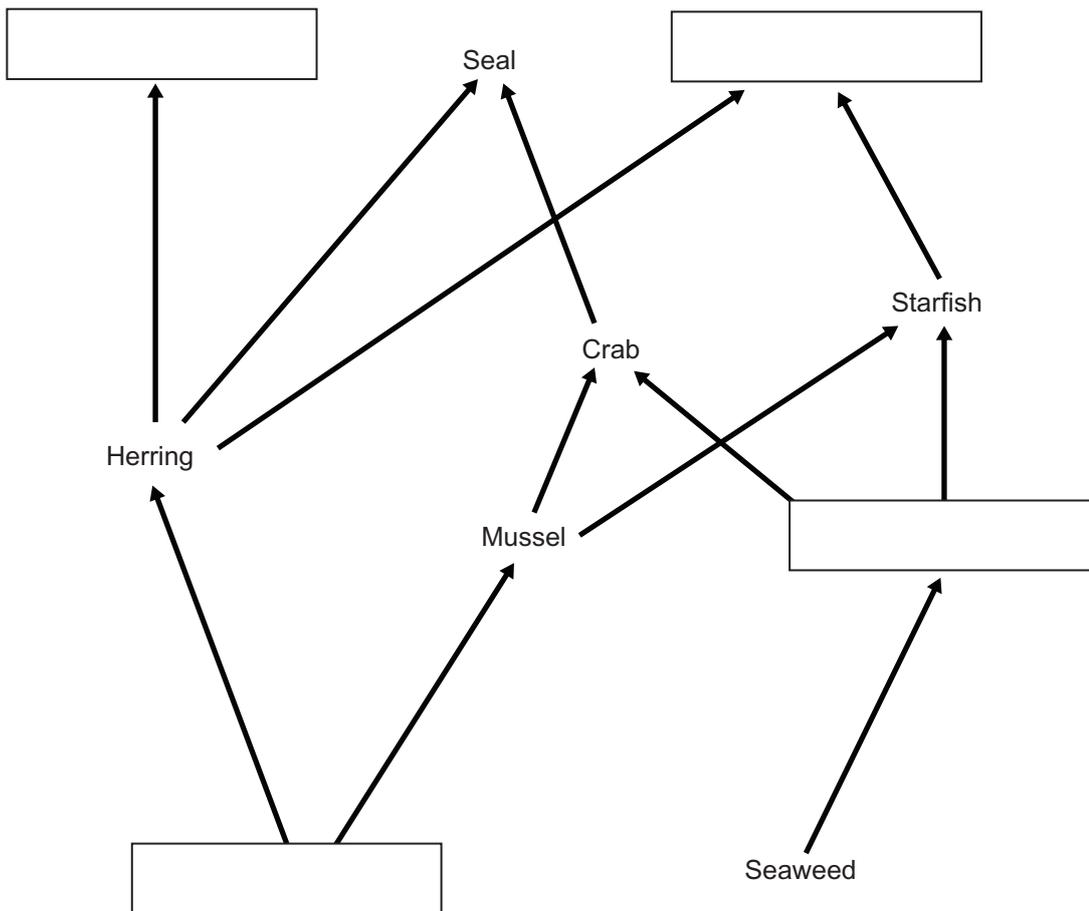
_____ [1]

Examiner Only	
Marks	Remark

6 The table shows some marine organisms and their diet.

Organism	Diet
Dolphin	Herring
Seal	Herring and Crab
Starfish	Mussel and Limpet
Herring	Plankton
Crab	Mussel and Limpet
Limpet	Seaweed
Seagull	Herring and Starfish
Mussel	Plankton

(a) Complete the food web using the information in the table.



[4]

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(b) What is the role of the producers in the food web?

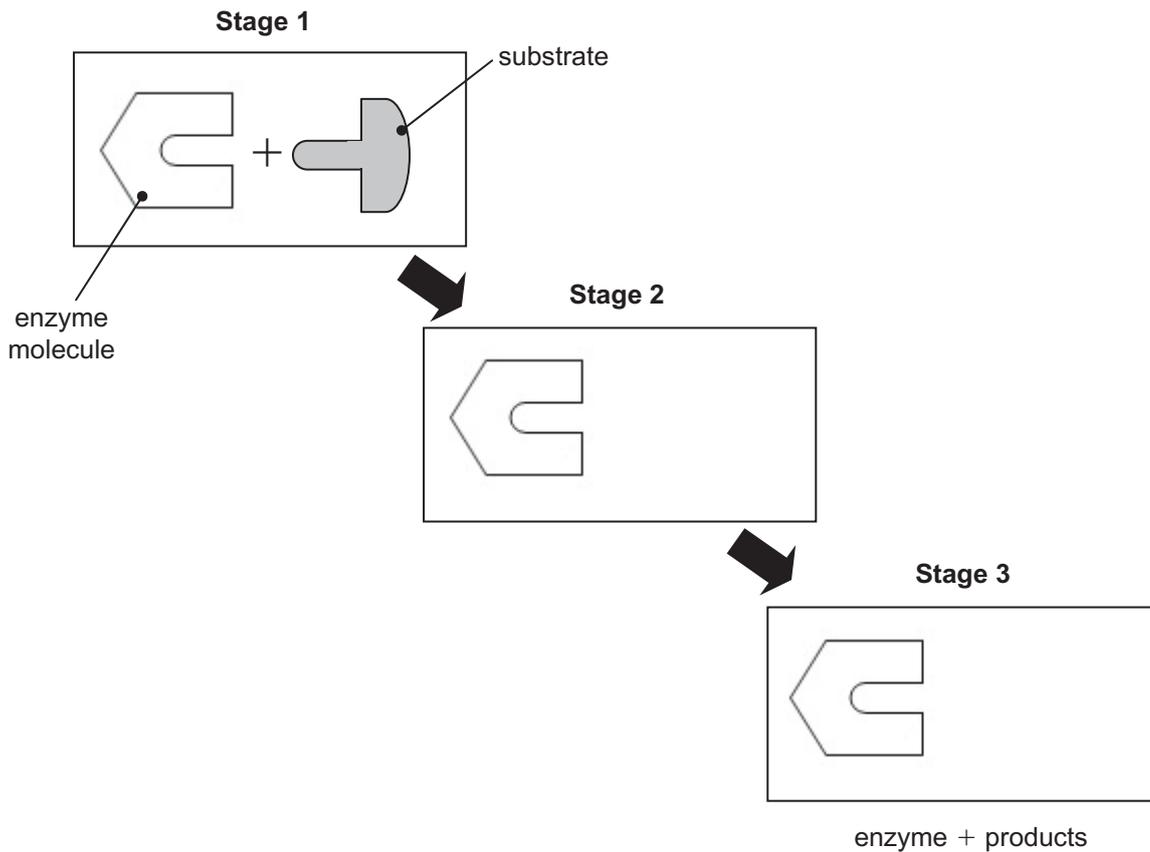
 [2]

(c) Suggest why the seal population might decrease if the mussels were poisoned.

 [2]

Examiner Only	
Marks	Remark

- 7 The diagram shows a model of how an enzyme molecule acts on a substrate.



(a) (i) Name this model. _____ [1]

(ii) **Complete** Stage 2 and Stage 3 of this model. [2]

A cell contains only a small amount of this enzyme, yet each enzyme molecule is able to act on thousands of substrate molecules in a minute.

(iii) Explain what happens to this enzyme molecule, after Stage 3, to allow it to act on thousands of substrate molecules.

 _____ [1]

Examiner Only	
Marks	Remark

Soft-centred mint chocolates are made using enzymes. The mint centre is hard when first made so that it will not melt when covered with hot chocolate. After the chocolate has solidified the sweet is kept at 18 °C for fourteen days. During this time an enzyme called invertase breaks down the complex sugar in the mint centre making it softer and sweeter.

One manufacturer wanted to find a new enzyme to use in this process to reduce the time needed to soften the mints. Their scientists carried out experiments using four new enzymes A, B, C and D. Each experiment used the same mass of solid mint centre and the same concentration of enzyme.

The table shows the time taken by each of the new enzymes to make the mint go soft.

Enzyme	Time taken to soften the mint/days
Invertase	14
A	20
B	10
C	18
D	17

- (b) (i) **Suggest** which of the new enzymes, A, B, C or D, the manufacturer would choose to reduce the time taken to soften the mints.

Give a reason for your answer.

Enzyme _____ [1]

Reason _____

_____ [1]

Examiner Only

Marks Remark

Another scientist checked the method of the experiment and concluded that some of the factors had not been controlled.

- (ii) Choose **two** factors from the list below, which should have been controlled in the manufacturer's experiments.

Place a tick (✓) in two of the boxes.

- | | |
|---------------------------------|--------------------------|
| temperature | <input type="checkbox"/> |
| humidity | <input type="checkbox"/> |
| light intensity | <input type="checkbox"/> |
| oxygen concentration | <input type="checkbox"/> |
| pH | <input type="checkbox"/> |
| softness of the mint at the end | <input type="checkbox"/> |

[2]

Examiner Only	
Marks	Remark

(b) The table shows the amount of vitamin C in different fruit juices.

Fruit juice		Mass of vitamin C in 1 cm ³ of juice/mg		
		Measurement 1	Measurement 2	Average
Orange	Fresh	0.4	0.6	0.5
	Carton	0.2	0.4	0.3
	1 week old	0.1	0.1	0.1
Blackcurrant	Fresh	0.9	0.5	0.7
	Carton	0.2	0.8	0.5
	1 week old	0.3	0.5	

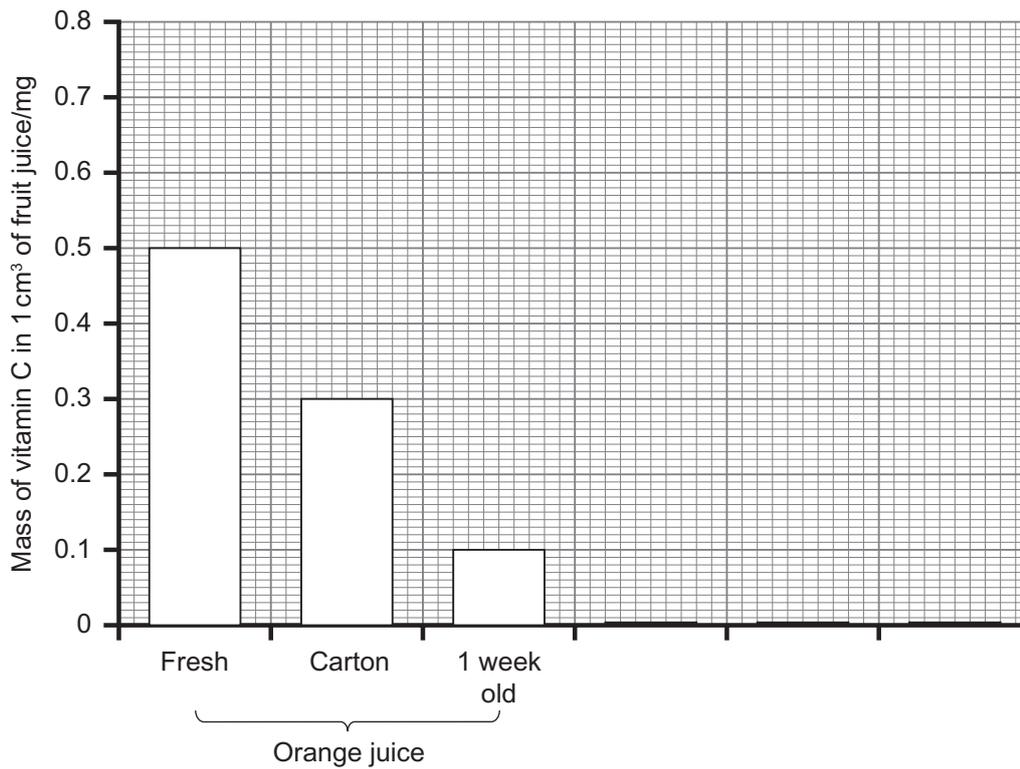
(i) Complete the table by calculating the average mass of vitamin C in the 1 week old blackcurrant juice. [1]

(ii) Explain which juice produced the least reliable results.

[2]

Examiner Only	
Marks	Remark

The graph shows the average mass of vitamin C in 1 cm³ of different fruit juices.



Examiner Only	
Marks	Remark

(iii) Complete the graph using the information in the table. [3]

(iv) Describe the trend shown by the results for fresh juices compared to carton juices.

[1]

(v) Use evidence from the graph to explain why you are advised to use juice within 1 week.

[1]

An adult is recommended to have a daily intake of 60 mg of vitamin C.

- (vi) Calculate the volume of carton orange juice which would provide an adult with their daily recommended intake of vitamin C. Show your working.

Volume _____ [2]

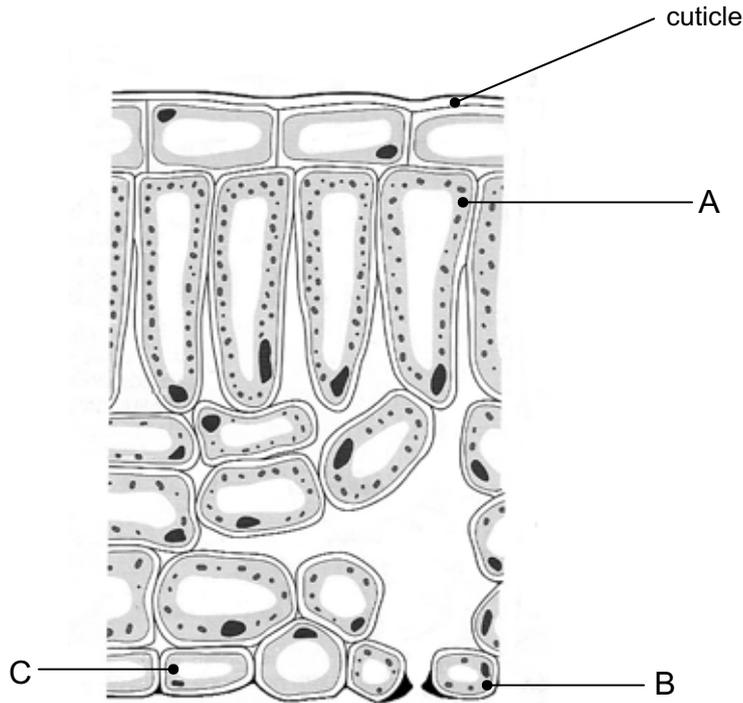
- (vii) Does this investigation provide sufficient evidence to support the conclusion that fresh blackcurrant juice contains more vitamin C than fresh orange juice?

Explain your answer.

_____ [1]

Examiner Only	
Marks	Remark

9 The diagram shows part of a leaf.



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(a) Name cells A, B and C.

A _____ [1]

B _____ [1]

C _____ [1]

(b) Explain how the cuticle is adapted to allow light to reach the mesophyll cells.

 _____ [1]

Examiner Only	
Marks	Remark

10 The nervous and hormonal systems carry information from one part of the body to another.

(a) Describe how the nervous and hormonal systems differ in the type of signal they use.

Nervous _____ [1]

Hormonal _____ [1]

(b) The table shows the relationship between the diameter of a neurone and the speed of conduction.

Organism	Neurone diameter/ μm	Speed of conduction/ m s^{-1}
Cat	1	3
Crab	30	5
Worm	50	30
Squid	500	35

(i) Describe the relationship between the diameter of a neurone and the speed of conduction.

 _____ [1]

(ii) Suggest why the large diameter of the squid's neurones helps it to escape predation by whales.

 _____ [1]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

- 11 When investigating the energy requirements of boys and girls with a normal activity level, a scientist found the following table in a research document.

Age/years	Energy requirement/kJ per day	
	Boys	Girls
1–3	5 150	4 878
4–6	7 180	6 469
7–10	8 248	7 285
11–14	9 295	7 725
15–18	11 535	8 834

- (a) What conclusions can be reached from these results?

[2]

- (b) A thirteen year old boy with normal activity levels has a daily energy intake of 9 500 kJ.

Describe **two** ways the boy's adult health may be affected by this daily energy intake.

[2]

- (c) Explain why the energy requirements change when a woman becomes pregnant.

[1]

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Marks Remark

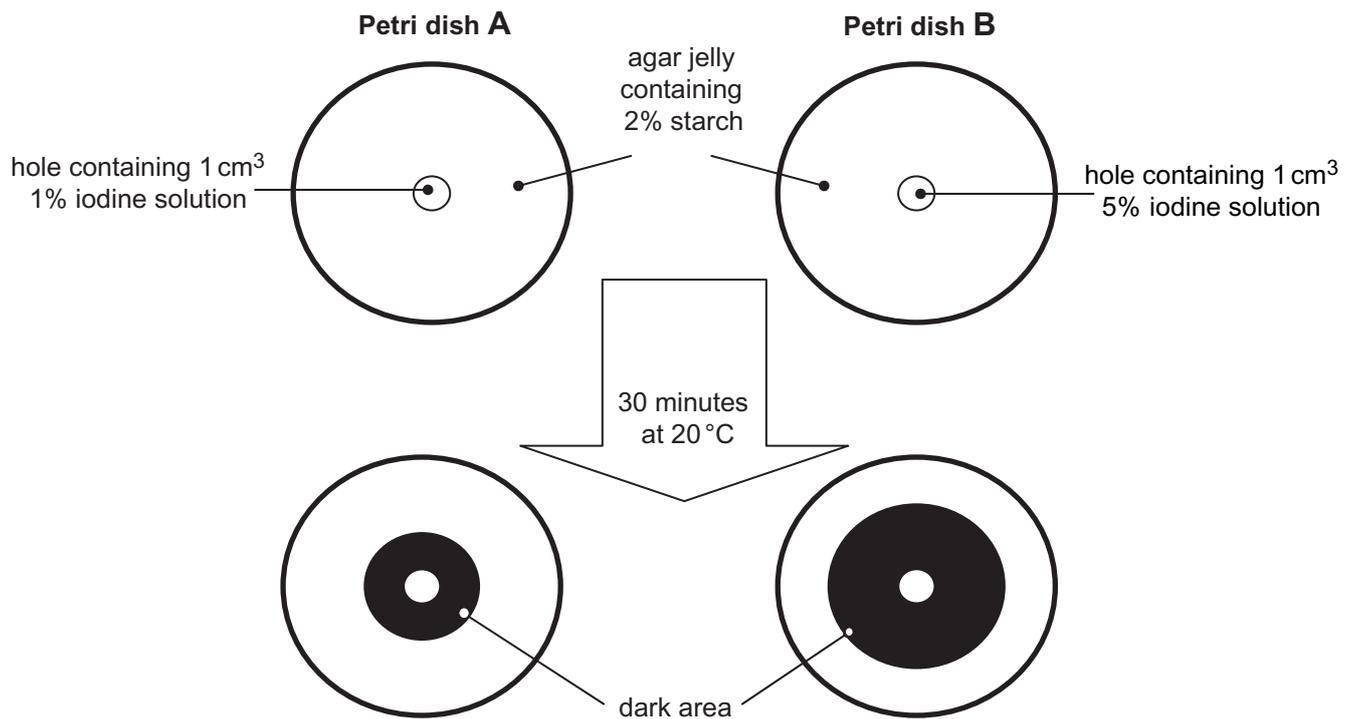
Human health can be affected by the quantity of food eaten, healthy food choices and infections by microorganisms.

(d) Give **one other** factor which affects human health.

[1]

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Marks	Remark

- 12 The diagram shows an experiment to investigate the effect of increasing the concentration of iodine solution on the rate at which iodine diffuses through agar jelly.



Describe and explain the conclusions that can be made from the results of this experiment.

In this question, you will be assessed on your written communication skills, including the use of specialist scientific terms.

[6]

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THIS IS THE END OF THE QUESTION PAPER

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