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EDEXCEL COMBINED SCIENCE BIOLOGY: QUESTIONS BY TOPIC

Animal Coordination, Control and Homeostasis (7)

Combined Science Biology (Foundation) Topic 7

6 questions · 56 marks · Mark schemes included

Pearson Edexcel Combined Science (9-1) Biology 1SC0, Foundation Tier, June 2018 - June 2025

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HOW TO USE THIS BOOKLET

Questions run from the lowest mark tariff to the highest, so similar questions sit together.

Click any row below to jump straight to that question.

On every question page, click ANSWER in the top-right corner to jump to its mark scheme.

Diagrams, graphs, tables and data are printed exactly as they appeared in the original papers.

QUESTION	SOURCE	MARKS	PAGE
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2. Q1	Paper 2 June 2018	9	7
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QUESTIONS

6 questions · 56 marks · lowest tariff first



7-MARK QUESTIONS

1 question in this booklet



- 1 (a) Draw **one** straight line from each hormone to the endocrine gland that produces it.

(2)

hormone	endocrine gland
insulin	pituitary
	adrenal
	ovaries
oestrogen	testes
	pancreas

- (b) Figure 1 shows the concentration of glucose in the blood of a person for a period of six hours.

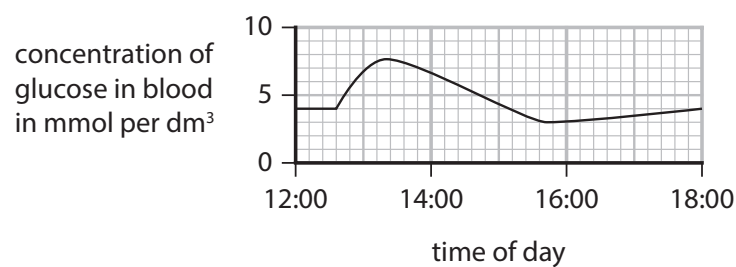


Figure 1

- (i) State the highest blood glucose concentration during this six hour period.

(1)

..... mmol per dm³

(ii) Insulin was released from the pancreas at 13:30.

Describe the changes in the concentration of glucose in the blood from 13:30 to 18:00.

(2)

.....

.....

.....

.....

(c) The cells of people with type 2 diabetes do not respond to insulin.

Describe **two** ways that a person with type 2 diabetes can control the concentration of glucose in their blood.

(2)

1

.....

2

.....

(Total for Question 1 = 7 marks)



9-MARK QUESTIONS

2 questions in this booklet



- 1 Insulin is produced by an endocrine gland and is transported in the blood.
- (a) (i) Which row shows the endocrine gland and the target organs for insulin? (1)

	endocrine gland	target organs
☒ A	adrenal	liver and muscles
☒ B	adrenal	small and large intestines
☒ C	pancreas	liver and muscles
☒ D	pancreas	small and large intestines

- (ii) Which part of the blood transports insulin to its target organs? (1)
- ☒ A plasma
- ☒ B red blood cells
- ☒ C white blood cells
- ☒ D platelets

WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(b) Figure 1 shows the blood glucose and blood insulin concentration for a healthy person during one day.

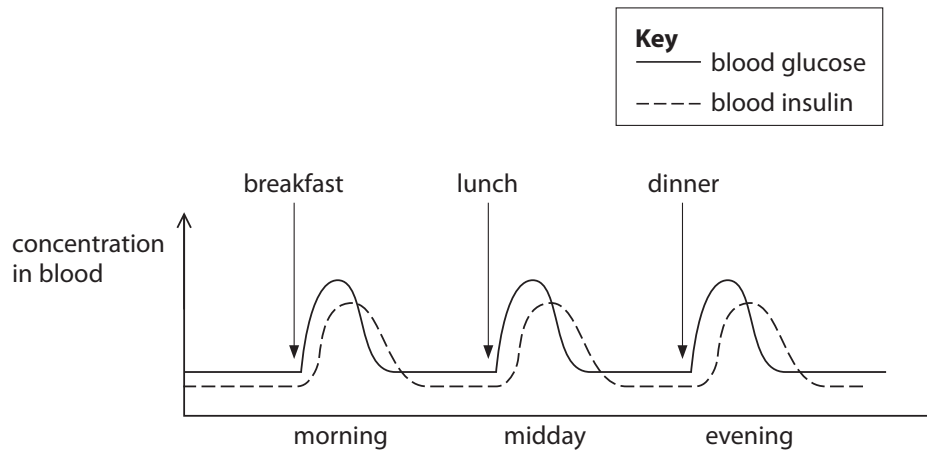


Figure 1

The blood glucose concentration increases after a meal.

Explain why the blood glucose concentration then decreases.

(2)

.....

.....

.....

.....

.....

(c) State **one** cause of type 1 diabetes.

(1)

.....

.....



(d) Explain how controlling the diet can be used to treat type 2 diabetes.

(2)

.....

.....

.....

.....

(e) A scientist is planning to test a new treatment for type 2 diabetes.

She selects 300 volunteers who have type 2 diabetes.

State **two** other factors that the scientist should consider when selecting the 300 volunteers.

(2)

1

2

(Total for Question 1 = 9 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



3 Hormones are chemicals produced in endocrine glands.

(a) Draw **one** straight line from each hormone to the endocrine gland that produces it.

(2)

hormone

endocrine gland

thyroxine

thyroid gland

pituitary gland

pancreas

adrenal glands

ovaries

adrenalin



(b) Figure 7 shows some of the changes that occur during the menstrual cycle.

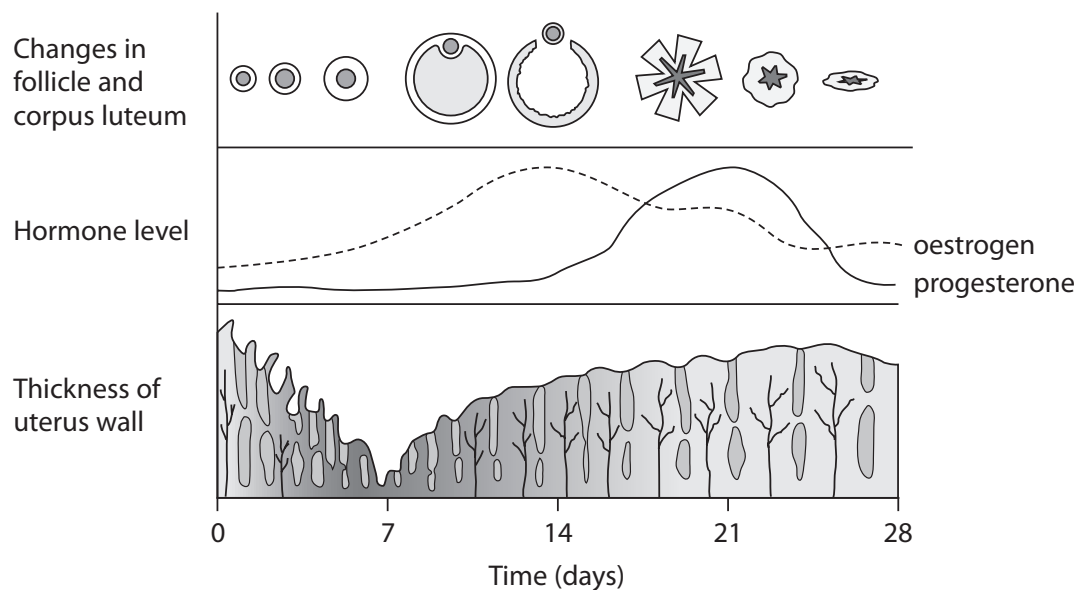


Figure 7

(i) The level of oestrogen peaks on day 13.

State the effect on the follicle caused by the peak in oestrogen.

(1)

(ii) Describe the effect of progesterone on the uterus lining from day 13 to day 21.

(2)

(c) The condom is an example of a barrier contraceptive.

State **one** advantage and **one** disadvantage of using this barrier method of contraception.

(2)

Advantage

Disadvantage

(d) The contraceptive pill is an example of a hormonal method of contraception.

Explain **one** way that the contraceptive pill stops a woman from becoming pregnant.

(2)

(Total for Question 3 = 9 marks)



10-MARK QUESTIONS

2 questions in this booklet



3 (a) Endocrine glands make hormones.

Which endocrine gland is situated in the head and is attached to the brain?

(1)

- ☐ **A** adrenal
- ☐ **B** pancreas
- ☐ **C** pituitary
- ☐ **D** thyroid

Diabetics cannot effectively control the concentration of glucose in their blood.

(b) Person A has type 1 diabetes.

Person B has type 2 diabetes.

Draw one straight line from each person to the cause of their type of diabetes.

(2)

person

cause

person A (type 1)

• does not have a pancreas

• cannot digest fatty foods

• does not produce insulin

person B (type 2)

• has cells that have stopped responding to insulin

• cannot transport insulin in the blood



- (c) A scientist investigated how the waist to hip ratio affected the probability of developing type 2 diabetes.

The scientist chose 100 females in each of five waist to hip ratio groups and recorded if they developed type 2 diabetes.

Figure 6 shows the results.

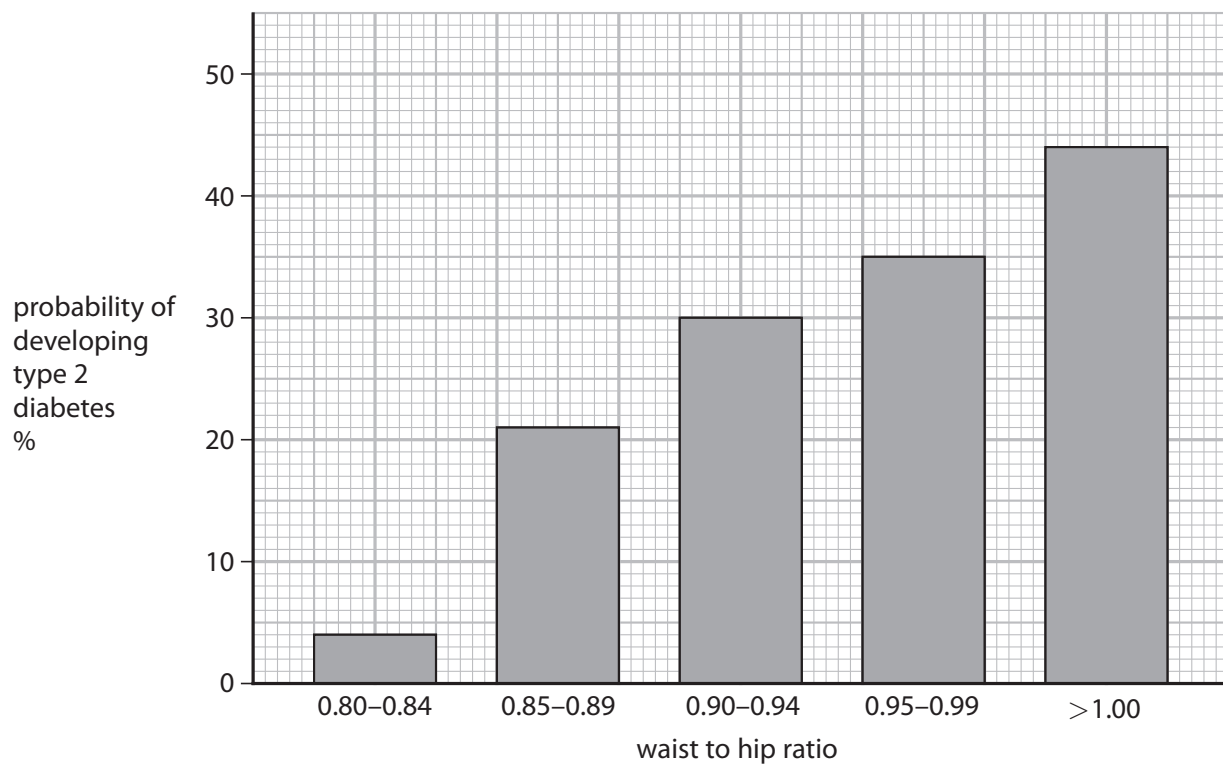


Figure 6

- (i) Describe the trend shown in Figure 6.

Use data from Figure 6 in your answer.

(2)

.....

.....

.....

.....

- (ii) A female has a waist measurement of 78.3 cm and a hip measurement of 90.0 cm.

Calculate the waist to hip ratio for this female and use Figure 6 to estimate the probability that she will develop type 2 diabetes.

(2)

probability..... %

- (d) (i) The scientist also measured the BMI of the females.

BMI and waist to hip ratio are two factors that affect the probability of females developing type 2 diabetes.

State **two** other factors about the females in the study that would affect the probability of them developing type 2 diabetes.

(2)

1

2

- (ii) State why an athlete may have a high BMI but still have a low probability of developing type 2 diabetes.

(1)

(Total for Question 3 = 10 marks)



3 Endocrine glands produce hormones.

(a) Draw **two** crosses on Figure 4 to show the position of the ovaries.

(1)



Figure 4

(b) Progesterone is produced in the ovaries.

State **one** effect of progesterone on the uterus lining.

(1)

(c) Insulin is a hormone that controls blood glucose concentration.

(i) Which endocrine gland produces insulin?

(1)

- ☐ **A** thyroid
- ☐ **B** pancreas
- ☐ **C** adrenal
- ☐ **D** pituitary

(ii) State how insulin is transported from its endocrine gland to its target organs.

(1)

(iii) Name the main target organ for insulin.

(1)

(d) People with type 1 diabetes cannot produce insulin.

Figure 5 shows the blood glucose concentration for a person with type 1 diabetes.

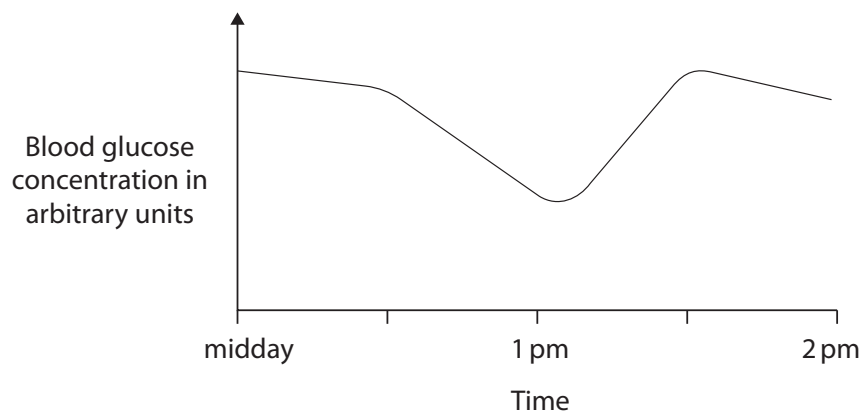


Figure 5

(i) Describe the trend from midday to 1 pm.

(2)

(ii) State what a person with type 1 diabetes could have done to cause the change in the blood glucose concentration from 1.05 pm to 1.30 pm.

(1)



(e) People with type 2 diabetes have cells that do not respond to insulin.

State **two** ways that people with type 2 diabetes can control their blood glucose concentration.

(2)

1

.....

2

.....

(Total for Question 3 = 10 marks)



11-MARK QUESTIONS

1 question in this booklet



- 5 People with diabetes cannot always control the concentration of glucose in their blood.

(a) Two people eat identical meals.

One person has diabetes, the other person does not have diabetes.

Figure 9 shows the concentration of glucose in the blood of these two people after eating the meals.

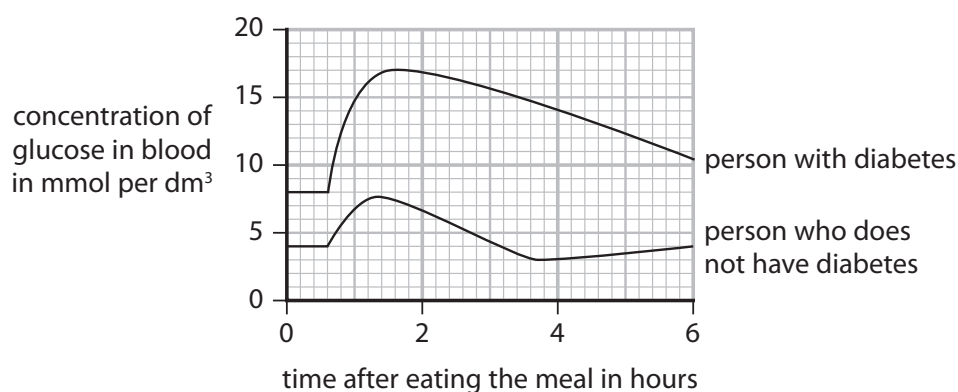


Figure 9

- (i) Describe **two** differences in the concentration of glucose in the blood of the two people shown in Figure 9.

(2)

1

2

- (ii) Calculate the maximum increase in the concentration of glucose in the blood of the person with diabetes.

(1)

..... mmol per dm³

- (iii) Water moved out of the red blood cells of the person with diabetes when the concentration of glucose in the blood was above 15 mmol per dm^3 .

Explain why water moved out of the red blood cells of the person with diabetes.

(2)

- (b) The pancreas produces a hormone that causes the concentration of glucose in the blood to decrease.

(i) Name this hormone.

(1)

(ii) State how this hormone is transported from the pancreas to its target organs.

(1)

- (iii) Which is the target organ for the hormone that controls the concentration of glucose in the blood?

(1)

- ☐ A kidney
- ☐ B pancreas
- ☐ C liver
- ☐ D lung

(c) Explain how type 2 diabetes can be controlled.

(3)

.....

.....

.....

.....

.....

.....

(Total for Question 5 = 11 marks)



MARK SCHEMES

official Pearson Edexcel mark schemes



Question number	Answer	Mark
1(a)	hormone endocrine gland Do not award mark if two lines are drawn from either hormone box.	(2)

Question number	Answer	Additional guidance	Mark
1(b)(i)	7.6 (mmol per dm ³)	accept a range of 7.2 - 8.0	(1)

Question number	Answer	Additional guidance	Mark
1(b)(ii)	A description including two from: - decreases (1) - and then increases (1)		(2)

Question number	Answer	Additional guidance	Mark
1(c)	A description including two from: • control diet (1) • exercise (1) • take medication (1)	accept eat fewer carbohydrates / sugars / glucose / eat a low fat diet ignore healthy diet / balanced diet / go on a diet accept lose weight against MP1 or 2 accept use metformin accept use insulin accept take named medication	(2)

Total for Question 1 = 7 marks

Question number	Answer	Mark
1(a)(i)	C pancreas liver and muscles 1. The only correct answer is C <i>A is not correct because the adrenal glands do not produce insulin</i> <i>B is not correct because the adrenal glands do not produce insulin and the small and large intestines are not the target organs for insulin</i> <i>D is not correct because the small and large intestines are not the target organs for insulin</i>	(1) AO 1 1

Question number	Answer	Mark
1(a)(ii)	A plasma 1. The only correct answer is A <i>B is not correct because red blood cells do not transport insulin</i> <i>C is not correct because white blood cells do not transport insulin</i> <i>D is not correct because platelets do not transport insulin</i>	(1) AO 1 1

Question number	Answer	Additional guidance	Mark
1(b)	An explanation that includes two from: (more) insulin (is released / produced) (1) - causes glucose to be converted to glycogen (1) - glucose is used for respiration (1)	accept glucose is stored (in the body / muscles / liver) accept glucose is used in exercise	(2) AO 2 1

Question number	Answer	Mark
1(c)	Any one from: • (pancreas / body) {does not make insulin / makes very little insulin} (1) • {pancreatic /beta} cells are absent / destroyed (by immune system) (1) • (condition is) {inherited / genetic} / (can be) born with the condition (1)	(1) AO 1 1

Question number	Answer	Mark
1(d)	An explanation that includes the following: • reduce the levels of carbohydrate / sugars / glucose in the diet (1) • to ensure that blood glucose levels do not rise too high / too quickly / so that the insulin can cope. (1) OR • lose weight (1) • insulin resistance reduced / body will produce more insulin / cells respond to insulin (1)	(2) AO 1 2

Question number	Answer	Additional Guidance	Mark
1(e)	Any two from: • gender (1) • age (1) • life style / exercise / diet (1) • size / weight / BMI (1)	accept health (1)	(2) AO 2 2

Total for Question 1 = 9 marks

Question number	Answer	Mark
3(a)	hormone thyroxine adrenalin endocrine gland thyroid gland pituitary gland pancreas adrenal glands ovaries Do not award mark if more than one line is drawn from the thyroxine box. Do not award mark if more than one line is drawn from the adrenalin box.	(2)

Question number	Answer	Mark
3(b)(i)	Follicle ruptures / ovulation / {egg / ovum} is released	(1)

Question number	Answer		Mark
3(b)(ii)	A description including two from: - progesterone levels increase (1) - uterus (lining) thickens / is maintained (1) - number of blood vessels (in uterus (lining)) increase / blood vessels increase in size (1)	accept prepares uterus (lining) for an ovum (to implant) (1)	(2)

Question number	Answer	Mark
3(c)	An answer including one advantage and one disadvantage advantages: gives protection from STIs / non-prescription / easy to use / does not affect (the users) fertility / high success rate (if used properly) (1) disadvantages: can split / not as effective if past use by date / allergic to latex / reduced sensitivity (1)	(2)

Question number	Answer	Additional guidance	Mark
3(d)	An explanation including: - the pill contains oestrogen and / or progesterone (1) (which) prevents ovulation / thickens mucus (1) (so) sperm can't {reach / join / fertilise} the ovum	accept egg for ovum throughout	(2)

Total for question 3 = 9 marks

Question number	Answer	Mark
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Question Number	Answer	Additional guidance	Mark
3(a)	C pituitary The only correct answer is C <i>A is not correct because the adrenal glands is situated in the abdomen.</i> <i>B is not correct because the pancreas is situated in the abdomen.</i> <i>D is not correct because the thyroid gland is situated in the neck.</i>		(1) AO1.1

Question Number	Answer	Additional guidance	Mark
3(b)			(2)

Question Number	Answer	Additional guidance	Mark
3(c)(i)	A description including: - as the waist to hip ratio increases the probability of developing type 2 diabetes increases (1) - accurate data from the results is used in the answer (1)	accept as one increases, the other increases ignore the columns get bigger	(2) A03.1ab

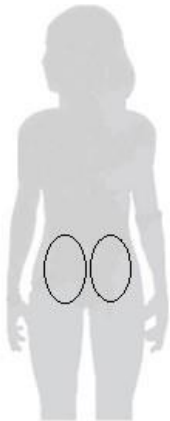
Question Number	Answer	Additional guidance	Mark
3(c)(ii)	evaluation $(78.3 \div 90.0) = 0.87$ (1)		(2)

Question Number	Answer	Additional guidance	Mark
3(d)(i)	Any two from: • age (1) • diet (1) • exercise regime (1) • ethnicity (1) • genetic makeup (1)	accept other valid factors	(2) A03.3b

Question Number	Answer	Additional guidance	Mark
3(d)(ii)	their high BMI is due to a high % of muscle (instead of fat)	accept their waist to hip ratio is low	(1) A03.3ab

(Total for question 3 = 10 marks)

Question Number	Answer	Mark
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Question Number	Answer	Additional guidance	Mark
3(a)	two crosses to show the position of the ovaries in the regions shown. 	accept dots, letters, shading for crosses accept label lines to correct areas do not award if three crosses are drawn on the diagram	(1)

Question Number	Answer	Additional guidance	Mark
3(b)	repairs / thickens / increases blood supply / maintains (uterus lining)	ignore it expands / strengthens	(1)

Question Number	Answer	Mark
3(c) (i)	B pancreas The only correct answer is B A is incorrect because the thyroid gland does not make insulin C is incorrect because the adrenal glands do not make insulin D is incorrect because the pituitary gland does not make insulin	(1)

Question Number	Answer	Additional guidance	Mark
3(c) (ii)	in the blood / plasma	accept in the blood system / in blood vessels / in arteries / in veins ignore capillaries	(1)

Question Number	Answer	Additional guidance	Mark
3(c) (iii)	liver	accept muscles	(1)

Question Number	Answer	Additional guidance	Mark
3(d) (i)	A description including: the concentration of glucose in the blood - decreases (1) - then decreases at a faster rate (between 12.30pm and 1pm) (1)	accept negative correlation	(2)

Question Number	Answer	Additional guidance	Mark
3 (d) (ii)	eaten a meal / eaten food	accept drink a named source of sugar e.g. fruit juice accept injected with glucagon	(1)

Question Number	Answer	Additional guidance	Mark
3 (e)	An answer including two from: • reduce {carbohydrate / sugar / glucose} in their diet (1) • exercise (1) • lose weight (1)	accept control their diet ignore healthy diet / balanced diet / go on a diet accept inject insulin / take medication / take named medication (1) award one mark for control their lifestyle if no other mark is awarded	(2)

Total for question 3 = 10 marks



Question number	Answer	Additional guidance	Mark
5(a) (i)	A description including two from: The blood glucose concentration for the person with diabetes (compared with the person who does not have diabetes) is • always higher (1) • reduces at a slower rate (1) • does not return to pre meal levels (in the six-hour period) (1) • does not get lower than pre meal levels (1)	accept reverse description accept other valid comparisons (1) accept concentrations (without units) from graph	(2)

Question number	Answer	Mark
5(a) (ii)	9 (mmol per dm ³)	(1)

Question number	Answer	Additional guidance	Mark
5(a)(iii)	An explanation including: • (water moves out) by osmosis (1) • because the concentration of glucose is higher in the blood (plasma) (1) • across a partially permeable membrane (1)	accept from a high water potential inside the cell to a low water potential outside the cell	(2)

Question number	Answer	Mark
5(b)(i)	insulin	(1)

Question number	Answer	Additional guidance	Mark
5(b)(ii)	in the blood / plasma	accept dissolved / in solution	(1)

Question number	Answer	Mark
5(b)(iii)	The only correct answer is C liver A is incorrect because the target organ is not the kidney B is incorrect because the pancreas produces insulin D is incorrect because the target organ is not the lungs	(1)

Question number	Answer	Additional guidance	Mark
5(c)	An explanation including three from: • exercise (1) • control diet / lose weight (1) • to {reduce / control} blood glucose (1)	accept avoid {sugar/carbohydrate} in your diet accept methods of testing blood for signs of diabetes (1) accept take {medication / metformin / insulin} (1)	(3)

Total for question 5 = 11 marks

