AQA GCSE Biology | 8461

SPECIFICATION POINT 4.5.3.2

Control of blood glucose concentration

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**23**
Available paper years	**2007–2024**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.5.3.2 Control of blood glucose concentration

Answer 01 · Mark scheme

March 2007 | BLY1A | Original Q2 | Legacy

Two	**A**	arthritis	**2**
	B	diabetes	**1**
	C	heart disease	**3**
	D	high blood pressure	**4**

4.5.3.2 Control of blood glucose concentration

Answer 02 · Mark scheme

January 2009 | BLY2F | Original Q7 | Legacy

question	answers	extra information	mark
7(a)(i)	pancreas	allow phonetic spelling	1
7(a)(ii)	glucose into cells / liver / muscles	allow any named organ / cell allow turned into / stored as glycogen **but** do **not** allow hybrid spellings for glycogen allow increases respiration allow stored as / turned into fat	1
7(b)(i)	reference to "98.6% of all people who used Diacure reported an improvement in their condition."	allow claim **1** / **1** / the first one	1
7(b)(ii)	(only) 30 patients **or** not enough / not many patients	allow only one trial **or** only done once **or** not repeated ignore bias	1
7(b)(iii)	little effect / difference suggest drug is not effective (in long term)	allow no effect allow only drops by 4 (±1) allow wouldn't persuade people to take it	1 1
7(b)(iv)	avoid bias / owtte	eg company could change / ignore results / might lie ignore fair / accurate / reliable / valid	1
Total			**7**

4.5.3.2 Control of blood glucose concentration

Answer 03 · Mark scheme

March 2009 | BLY1AP | Original Q2 | Legacy

Two	**A**	a diet low in fat	**3**
	B	a diet high in sugar	**1**
	C	a diet high in salt	**2**
	D	a diet high in saturated fat	**4**

Answer 04 · Mark scheme

March 2009 | BLY1BP | Original Q4 | Legacy

Four	**A**	insulin is produced by genetically engineered bacteria	**3**
	B	diabetics inject insulin to control diabetes	**4**
	C	the insulin gene is ‘cut out’ using enzymes	**1**
	D	the insulin gene is transferred into a bacterium	**2**

4.5.3.2 Control of blood glucose concentration

Answer 05 · Mark scheme June 2009 | BLY2F | Original Q6 | Legacy

Question 6

question	answers	extra information	mark
6(a)(i)	50	award **2** marks for correct answer irrespective of working award **1** mark for selection of 60 **and** 10	2
6(a)(ii)	any **two** from: • increases • (then) decreases • highest at 65 – 74 (years old) **or** maximum 112 (per thousand)	ignore comparisons with men allow peaks at 65 - 74	2
6(b)(i)	stomach		1
6(b)(ii)	any sensible reference to diet **or** carbohydrate intake **or** pancreas / stem cell transplant	eg eat less / no sugary food **or** eat more fibre **or** go on a diet **or** watch what you eat ignore eat more protein do **not** accept reduce salt	1
Total			**6**

4.5.3.2 Control of blood glucose concentration

Answer 05 · Mark scheme

June 2009 | BLY2F | Original Q6 | Legacy

BLY2F

4.5.3.2 Control of blood glucose concentration

Answer 06 · Mark scheme

January 2010 | BLY2F | Original Q3 | Legacy

Question 3

question	answers	extra information	mark
3(a)	pancreas		1
3(b)	the diabetic should get more energy from fat the diabetic should get less energy from carbohydrate		1 1
3(c)	(use) insulin	allow pancreas / stem cell transplant do **not** allow injection / transplant / stem cells / tablets alone ignore exercise	1
Total			**4**

4.5.3.2 Control of blood glucose concentration

Answer 06 · Mark scheme

January 2010 | BLY2F | Original Q3 | Legacy

BLY2F

4.5.3.2 Control of blood glucose concentration

Answer 07 · Mark scheme

June 2010 | BLY1F | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)	proteins		1
1(b)	heart disease		1
1(c)	high blood pressure		1
1(d)	irregular periods		1
Total			**4**

4.5.3.2 Control of blood glucose concentration

Answer 07 · Mark scheme

June 2010 | BLY1F | Original Q1 | Legacy

BLY 1F

4.5.3.2 Control of blood glucose concentration

Answer 08 · Mark scheme

June 2010 | BLY2F | Original Q5 | Legacy

Question 5

question	answers	extra information	mark
5(a)	pancreas		1
5(b)	any **one** from • (controlling / changing) diet • exercise • pancreas transplant	 accept descriptions as to how diet could be changed eg eat less sugar(y foods) ignore reference to fat / protein accept example eg go for a run accept named drug eg metformin	1
5(c)(i)	increase then fall relevant data quote (for male)	ignore reference to women max at ages 65 – 74 eg starts at 10 (per thousand) **or** max at 130 (per thousand) **or** ends at 120 (per thousand) accept a difference between any pairs of numbers in data set quoting of scale or per thousand but not 'thousands' accuracy ± 2	1 1 1

Question 5 continues on the next page

4.5.3.2 Control of blood glucose concentration

BLY2F

Question 5 continued

question	answers	extra information	mark
5(c)(ii)	(between 0 and 64) more females (than males) / less males (over 65) more males (than females) / less females	ignore numbers allow eg females more diabetic than males	1 1
Total			**7**

4.5.3.2 Control of blood glucose concentration

Answer 08 · Mark scheme

June 2010 | BLY2F | Original Q5 | Legacy

BLY2F

Answer 09 · Mark scheme

November 2010 | BLY1AP | Original Q1 | Legacy

Question	Key		
One	**A**	arthritis	**1**
	B	diabetes	**2**
	C	high blood pressure	**4**
	D	irregular periods	**3**

Answer 10 · Mark scheme

June 2011 | BLY1AP | Original Q8 | Legacy

Eight	**4**	**1**	**3**	**2**

4.5.3.2 Control of blood glucose concentration

Answer 11 · Mark scheme June 2011 | BLY2F | Original Q3 | Legacy

Question 3

question	answers	extra information	mark
3(a)	insulin	extra ring drawn cancels the mark	1
3(b)	pancreas	extra ring drawn cancels the mark	1
3(c)	diabetes	extra ring drawn cancels the mark	1
Total			3

Answer 11 · Mark scheme June 2011 | BLY2F | Original Q3 | Legacy

BLY2F

4.5.3.2 Control of blood glucose concentration

Answer 12 · Mark scheme

June 2013 | BL3FP | Original Q4 | Legacy

Question 4

question	answers	extra information	mark
4(a)	pancreas	allow phonetic spelling	1
4(b)(i)	A shortest / quicker time (to work)		1 1
4(b)(ii)	D acts for longest time	 mark dependent on D allow D will last until 09.00 / breakfast / 24 hours	1 1
4(b)(iii)	diet / exercise	if 'diet' is qualified, then will need correct qualification, e.g. 'less carbohydrate / sugar' accept pancreas transplant / stem cell treatment	1
Total			6

4.5.3.2 Control of blood glucose concentration

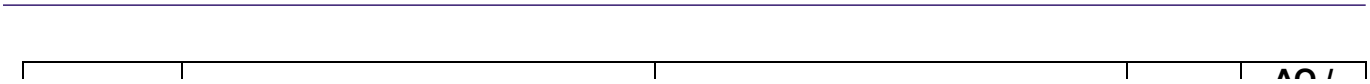
Answer 13 · Mark scheme June 2014 | BL3FP | Original Q2 | Legacy

Question	Answers	Extra information	Mark	AO / spec ref.
2(a)	brain blood sweat	in correct order only	1 1 1	AO1 3.3.2a, b,c
2(b)(i)	A		1	AO3 3.1.1e
2(b)(ii)	to replace ions lost (in sweat)	accept salts allow named examples, eg. prevent cramps	1	AO1 3.1.1e
2(b)(iii)	any **one** from: • there is too much glucose / sugar in the sports drink • they shouldn't have too much glucose / blood sugar • it would cause their blood glucose / sugar to rise (too high)		1	AO2 3.1.1d, 3.3.3d
Total			6	

4.5.3.2 Control of blood glucose concentration

Answer 13 · Mark scheme

June 2014 | BL3FP | Original Q2 | Legacy



4.5.3.2 Control of blood glucose concentration

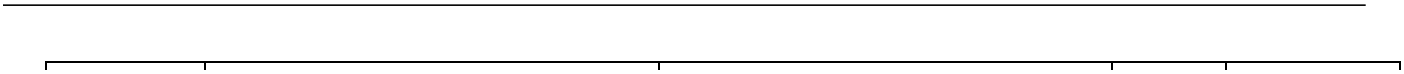
Answer 14 · Mark scheme June 2015 | BL3FP | Original Q6 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)(i)	**B**		1	AO2 333a
6(a)(ii)	**D**		1	AO2 333a
6(a)(iii)	**C**		1	AO2 333a
6(b)(i)	insulin		1	AO1 333a
6(b)(ii)	pancreas		1	AO1 333a
Total			**5**	

4.5.3.2 Control of blood glucose concentration

Answer 14 · Mark scheme

June 2015 | BL3FP | Original Q6 | Legacy



4.5.3.2 Control of blood glucose concentration

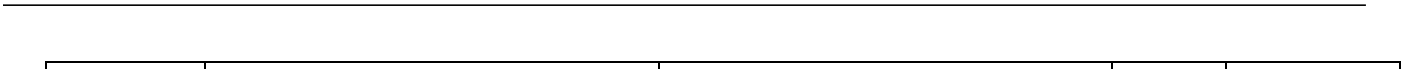
Answer 15 · Mark scheme June 2016 | BL3FP | Original Q4 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4(a)(i)	pancreas		1	AO1 3.3.3a
4(a)(ii)	Insulin causes glucose to move into cells.		1	AO1 3.33a
4(b)(i)	**A** rapid rise **or** fastest		1 1	AO2/3 3.3.3a
4(b)(ii)	2		1	AO2 3.3.3a
4(c)	The pancreas could be rejected.		1	AO2 3.3.1g
Total			**6**	

4.5.3.2 Control of blood glucose concentration

Answer 15 · Mark scheme

June 2016 | BL3FP | Original Q4 | Legacy



4.5.3.2 Control of blood glucose concentration

Answer 16 · Mark scheme June 2018 | 8461/1F | Original Q3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	(A) stomach		1	AO1 4.2.2.1
	(B) small intestine	allow ileum ignore intestine unqualified	1	
	(C) liver		1	
03.2	soluble	this order only	1	AO1 4.2.2.1
	catalyse		1	
	denatured		1	
03.3	amino acids		1	AO1 4.2.2.1
03.4	any **one** from: • for growth • for repair / replacement (of cells / tissues / organs)	allow for enzymes / hormones / antibodies allow to strengthen bones ignore for energy	1	AO1 4.2.2.1
03.5	stomach		1	AO1 4.2.2.1

4.5.3.2 Control of blood glucose concentration

Answer 16 · Mark scheme

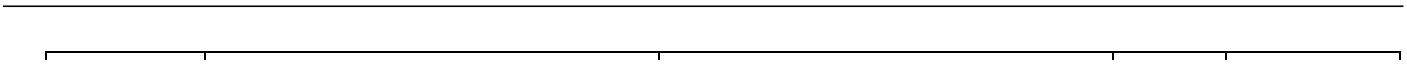
June 2018 | 8461/1F | Original Q3

Question	Answers	Mark	AO / Spec. Ref.
03.6	**Level 2:** Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.	3–4	AO1 4.2.2.1
	Level 1: Facts, events or processes are identified and simply stated but their relevance is not clear.	1–2	
	No relevant content	0	
	Indicative content • grinding up the food • add Biuret reagent (allow $CuSO_4$ and NaOH) to food (sample) • protein turns solution (from blue) to purple / lilac • wear goggles to protect eyes • clean up spills immediately • Biuret / NaOH is an irritant / corrosive / poisonous for **level 2** a reference to Biuret, a positive result and reason for a safety precaution is required		
03.7	fat	1	AO1 4.2.2.1
03.8	type 2 diabetes	1	AO1 4.2.2.6
Total		**15**	

4.5.3.2 Control of blood glucose concentration

Answer 16 · Mark scheme

June 2018 | 8461/1F | Original Q3



4.5.3.2 Control of blood glucose concentration

Answer 17 · Mark scheme June 2018 | 8461/2F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	pancreas		1	AO1 4.5.3.2
05.2	liver glycogen	in this order	1 1	AO1 4.5.3.2
05.3	would be digested / broken down (by enzymes / protease / pepsin / acid or to amino acids)	allow denatured (by acid)	1	AO2 4.2.2.1 4.5.3.2
05.4	use of 14.2 **and** 6.8 7.4	an answer of 7.4 scores **2** marks allow an answer of 7.2 or 7.3 (using 14.1 and / or 6.9) for **1** mark	1 1	AO2 4.5.3.2 AO3 4.5.3.2
05.5	any **one** from: • (person A's) results are higher • (A) increases for a longer time **or** peaks later • (A) takes longer to decrease **or** takes longer to return to normal	allow converse comparisons with person B as the subject ignore A peaks at a higher level than B allow other correct comparisons allow a description using pairs of figures from graph at a given time	1	AO2 4.5.3.2

4.5.3.2 Control of blood glucose concentration

Answer 17 · Mark scheme

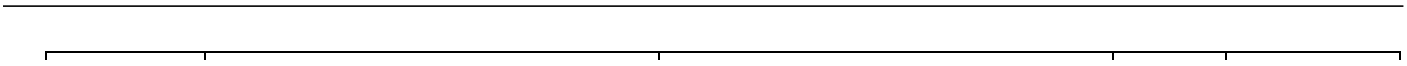
June 2018 | 8461/2F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	a negative correlation		1	AO2 4.5.3.2
05.7	less carbohydrate / sugar / fat in diet **or** lose weight **or** maintain a healthy weight (more) exercise	allow go on a diet allow eat less allow balanced / healthy diet ignore diet unqualified allow examples of exercise	1 1	AO1 4.5.3.2
Total			**10**	

4.5.3.2 Control of blood glucose concentration

Answer 17 · Mark scheme

June 2018 | 8461/2F | Original Q5



4.5.3.2 Control of blood glucose concentration

Answer 18 · Mark scheme June 2019 | 8461/1F | Original Q1

01.1	rice		1	4.2.2.1 AO3
01.2	25 (%)	allow an answer between 23 and 27 (%) ignore ¼ / 0.25	1	4.2.2.1 AO2
01.3	(beans) contain all (four) food groups	allow converse for chicken allow chicken contains no / less carbohydrate **or** beans contain carbohydrate allow beans contain more nutrients ignore references to water / fat / protein	1	4.2.2.1 AO3
01.4	amylase		1	4.2.2.1 AO1
01.5	Benedict's reagent		1	4.2.2.1 AO1
01.6	(brick) red / green / yellow / orange / brown		1	4.2.2.1 AO1
01.7	C		1	4.2.2.1 AO3
01.8	small intestine	allow ileum ignore intestine unqualified do **not** accept large intestine / duodenum	1	4.1.3.3 4.2.2.1 AO1
01.9	active transport osmosis		1 1	4.1.3.2 4.1.3.3 AO1 AO1
Total			**10**	

4.5.3.2 Control of blood glucose concentration

Answer 18 · Mark scheme

June 2019 | 8461/1F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.5.3.2 Control of blood glucose concentration

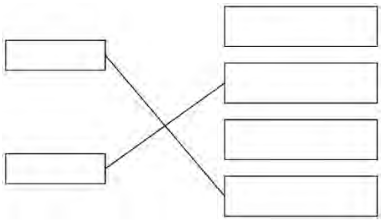
Answer 19 · Mark scheme June 2019 | 8461/1F | Original Q6

06.1	circulatory / circulation (system)	allow cardiovascular (system) ignore blood (system) ignore cardiorespiratory system	1	4.2.2.2 4.2.1 AO1
06.2	any valve ringed 	allow more than one valve separately ringed	1	4.2.2.2 AO1
06.3	prevent backflow (of blood) **or** ensure one-way flow	allow correct description of backflow allow maintains (correct) direction of blood	1	4.2.2.2 4.2.2.4 AO1
06.4	vein	allow correctly named veins	1	4.2.2.2 AO1
06.5	any **two** from: (referring to mechanical valves) • long lasting **or** durable **or** does not break / tear **or** does not wear out • do not need to go into hospital / surgery again • no ethical issues (surrounding use of living / animal tissue) • no risk of rejection • no need for anti-rejection / immunosuppressant drugs • no risk of transmission of disease	allow reliable allow less likely to need a replacement (after 5 years) ignore no need for a replacement	2	4.2.2.4 AO3

4.5.3.2 Control of blood glucose concentration

Answer 19 · Mark scheme

June 2019 | 8461/1F | Original Q6

Question	Answers	Extra information	Mark	AO / Spec.Ref.
06.6	no need to take anti-clotting medication	allow can't hear a pig valve allow can get a better fit with a pig valve allow less leaky with a pig valve allow less likely to get a heart attack / stroke ignore will not get blood clots (around the valve)	1	4.2.2.4 AO3
06.7		an additional line from a medical condition negates the mark	2	4.2.2.2 AO1
Total			**9**	

4.5.3.2 Control of blood glucose concentration

Answer 19 · Mark scheme

June 2019 | 8461/1F | Original Q6

Question	Answers	Extra information	Mark	AO / Spec. Ref.

4.5.3.2 Control of blood glucose concentration

Answer 20 · Mark scheme November 2021 | 8461/2F | Original Q2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	A		1	AO1 4.5.3.1
02.2	D		1	AO1 4.5.3.1 4.5.3.2
02.3	liver		1	AO1 4.5.3.2
02.4	glycogen		1	AO1 4.5.3.2
02.5	2.6 7.6 ($mmol/dm^3$)	allow answers in the range 2.5 to 2.7 allow a correctly calculated value using student's value from graph + 5	1 1	AO2 4.5.3.2
02.6	30 (minutes)	allow ½-hour **or** 0.5 hour	1	AO2 4.5.3.2
02.7	points too far apart **or** no reading between 30 and 50 mins **or** points joined by straight lines **or** values could have fallen to zero change before 50 mins	 allow no reading at 40 mins allow not a curve of best fit	1	AO3 4.5.3.2

4.5.3.2 Control of blood glucose concentration

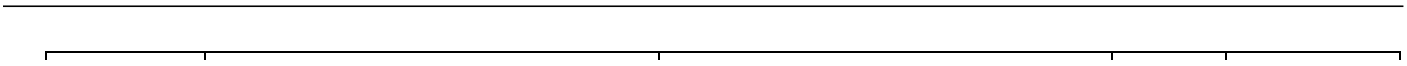
Answer 20 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.8	higher values of y than given line returning to(wards) zero change later than given line		1 1	AO2 AO3 4.5.3.2
Total			**10**	

4.5.3.2 Control of blood glucose concentration

Answer 20 · Mark scheme

November 2021 | 8461/2F | Original Q2



4.5.3.2 Control of blood glucose concentration

Answer 21 · Mark scheme

June 2022 | 8461/2F | Original Q10

Question 10

Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.1	an answer in the range 1.1 to 2(.0) (hours)		1	AO2 4.5.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.2	*effect* : lowered *explanation*: glucose taken in **or** glucose converted to glycogen **or** glucose used in respiration by cells / liver / muscles		1 1 1	AO1 4.5.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.3	underweight		1	AO3 4.5.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.4	(from) 67.5 (kg to) 90 (kg)	allow in the range 67 to 68 (kg) for 67.5 (kg) allow in the range 90 to 90.5(kg) for 90 (kg) allow from 90 (kg to) 67.5 (kg)	1	AO2 4.5.3.2

4.5.3.2 Control of blood glucose concentration

Answer 21 · Mark scheme

June 2022 | 8461/2F | Original Q10

Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.5	(person **C** has) higher glucose (than mean)	answers must be comparative allow comparison of higher glucose using numbers allow (person **C**'s) glucose is too high	1	AO3 4.5.3.2
	(person **C** has) higher insulin (than mean)	allow comparison of higher insulin using numbers allow (person **C**'s) insulin is too high do **not** accept (person **C** has) higher cholesterol ignore unprocessed data	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.6	(more) exercise	allow example of (more) exercise	1	AO1 4.5.3.2
	eat less carbohydrate / sugar **or** eat a low carbohydrate diet	allow eat less fat allow eat a carbohydrate controlled diet if no other marks awarded allow **1** mark for lose weight **or** maintain healthy weight **or** eat less **or** eat fewer calories ignore references to healthy / balanced diet **or** diet unqualified	1	

Total Question 10		**10**

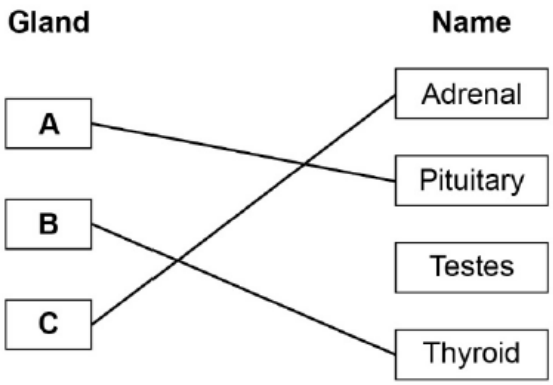
4.5.3.2 Control of blood glucose concentration

Answer 22 · Mark scheme June 2023 | 8461/2F | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.1	the endocrine system		1	AO1 4.5.3.1

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.2	by the blood		1	AO1 4.5.3.1

Question	Answers	Mark	AO / Spec Ref.
01.3	 do **not** accept more than one line from a box on the left	1 1 1	AO1 4.5.3.1

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.4	D		1	AO1 4.5.3.1 4.5.3.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.5	the liver		1	AO1 4.5.3.2

4.5.3.2 Control of blood glucose concentration

Answer 22 · Mark scheme June 2023 | 8461/2F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.6	any **one** from: • lowers (blood) glucose • (makes) cells / liver / muscles take in glucose • (changes) glucose to glycogen	allow sugar for glucose allow controls (blood) glucose allow makes glycogen	1	AO1 4.5.3.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.7	follicle stimulating hormone (FSH)		1	AO1 4.5.3.4

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.8	oestrogen progesterone		1 1	AO1 4.5.3.4

Question	Answers	Extra information	Mark	AO / Spec Ref.
01.9	any **two** from: • oral contraceptive • injection • implant • (skin) patch • (some) IUDs	allow the pill allow contraceptive rod allow IUS allow named methods allow coil with hormone	2	AO1 4.5.3.5

Total Question 1	13

4.5.3.2 Control of blood glucose concentration

Answer 23 · Mark scheme

June 2024 | 8461/2F | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.1	pancreas		1	AO1 4.5.3.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.2	the body cells take in a low amount of glucose from the blood		1	AO2 4.5.3.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.3	any **two** from: • (same) diet • (same diet for same) duration • (same / 30-minute) time before being given glucose • (same) volume of water and drug **X** • (same) volume of glucose (solution)	 if neither point given allow time allow (same) amount of water and drug **X** allow 2 cm^3 of drink allow (same) amount of glucose (solution) allow 1 cm^3 glucose (solution) if neither bp4 nor bp5 awarded, allow **1** mark for (same) volume / amount of drink	2	AO2 4.5.3.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.4	20 **and** 30 (30 – 20 =) 10 (minutes)	allow an answer in the range 28 to 32 for group **A** allow an answer consistent with values for **A** between 28 and 32	1 1	AO3 AO2 4.5.3.2

4.5.3.2 Control of blood glucose concentration

Answer 23 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.5	any **two** from: (with drug **X**) • lower **throughout** • lower maximum (concentration) • slower increase (in concentration) • slower decrease (in concentration) • returns to original (concentration) (sooner)		2	AO3 4.5.3.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.6	use different concentrations of drug **X**		1	AO3 4.5.3.2

Total Question 5	**9**

4.5.3.2 Control of blood glucose concentration

Answer 21 · Examiner comments

June 2022 | 8461/2F | Original Q10

Question 10

This was the final common question on the topic of insulin and blood glucose, and the relationship between obesity and Type 2 diabetes.

10.1 Over two-thirds of students selected appropriate times from the graph in **Figure 13** for when insulin would be expected to be in high concentration. The most common answers given were around the time of the peak in blood glucose concentration. Those students who gave incorrect times frequently chose 2.5 hours, the time when blood glucose was at a minimum. A number of students gave answers such as 5.9 or 6, showing that they had been reading the wrong scale, giving the peak blood glucose concentration as the answer. For possible future reference, students should be aware of the difference, for example, between 1:40 and 1.4, when referring to time – in this particular question either format was acceptable as it was sufficient to indicate a value within the correct range.

4.5.3.2 Control of blood glucose concentration

Answer 21 · Examiner comments June 2022 | 8461/2F | Original Q10

10.2 There was a low number of very detailed correct answers to explain the effect of insulin on blood glucose, usually referring to the *liver* and *glycogen*. Occasionally, from those students who attempted it, glycogen was misspelt in such a way that it could be confused with glucagon. Whether blood glucose concentration would be increased or decreased was given in similar proportions; however many appeared to misunderstand what was required on the 'effect' line.
Many students appeared to have little understanding of diabetes, with fewer than one third scoring any of the three marks available.

10.3 and **10.4** These questions involved interpretation of the height – body mass graph in **Figure 14**. Nearly 70 percent of students correctly deduced that person **A** was underweight, but only around one-third could give sufficiently precise values (68 to 90) for the range of healthy weights for person **B**, given a height of 1.9m, even though this fell on a major gridline. Although some tolerance was allowed, many gave values just outside those acceptable, such as 66 or 69 at the lower end and 89 or 91 at the upper end. Weaker students appeared to draw numbers from a variety of other places on the graph.

10.5 This question involved the selection of appropriate data from a simple table that compared blood concentratons of cholesterol, glucose and insulin in an obese person with mean values for people who did not have Type 2 diabetes. Just over a quarter of students were able to point out that person **C** had *higher* concentrations of both glucose and insulin. Simply quoting figures from the table, without a comparison, was inadequate, as was the use of a non-comparative term such as 'high' concentration. Any mention of cholesterol, which was quite common, was deemed inappropriate – the question tested the selection of *relevant* data.

10.6 The majority of students knew that exercise was a means of reducing the chance of developing Type 2 diabetes. Most also knew that 'diet' was relevant but many answers, such as 'a heathy diet' or 'a balanced diet' were inadequate; it was necessary to state that the diet contained less sugar / carbohydrate / fat or involved weight loss. Thus fewer than one in five scored both marks.

4.5.3.2 Control of blood glucose concentration

Use of statistics

Statistics used in this report may be taken from incomplete processing data. However, this data still gives a true account on how students have performed for each question.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

4.5.3.2 Control of blood glucose concentration

Answer 22 · Examiner comments

June 2023 | 8461/2F | Original Q1

Question 1

This question was about human hormones.

01.1 Almost two-thirds of students correctly selected the endocrine system as the name of the system with glands that produce hormones.

01.2 Two-thirds of students also chose the blood as the means of transport of hormones around the body.

01.3 Recognition of the hormone-producing glands in Figure 1 was less secure, with fewer than half of students able to assign all three names correctly to their positions in the body.

01.4 More than two-thirds of students recognised that gland D in Figure 1 was the source of insulin.

01.5 A large majority of students selected the liver as insulin's main target organ.

01.6 Around one-third of students were able to describe an effect of insulin in terms of lowering blood glucose or causing it to be taken in by cells or turned into glycogen.

Questions 01.7 to 01.9 related to the female reproductive hormones.

01.7 The vast majority of students selected FSH as the hormone that causes an egg to mature in the ovary.

Answer 22 · Examiner comments

June 2023 | 8461/2F | Original Q1

01.8 The vast majority of students were able to select the name of at least one hormone that helped to maintain the lining of the uterus, and almost two-thirds correctly selected two: oestrogen and progesterone.

01.9 Two methods of contraception that use hormones were required here and, although over three-quarters of students knew at least one, fewer than a half could give two. The most common answers were 'the pill', 'injections' or 'patches'. A surprising number of students could offer no suggestions, and 'condoms' were a common incorrect suggestion.

4.5.3.2 Control of blood glucose concentration

Answer 23 · Examiner comments June 2024 | 8461/2F | Original Q5

Question 5 (low and standard demand)

05.1 The majority of students knew that the pancreas produced insulin, with over 80% of students gaining the mark.

05.2 Half of students gained this mark showing an understanding that the body cells take in a low amount of glucose from the blood, in a person with Type 2 diabetes.

05.3 Students were presented with a method for an investigation and asked to identify two control variables. Three quarters of students were able to identify at least one control variable and many of those gained full marks. Common errors included being too vague; answers such as 'glucose' or 'water' were not credited. A significant number of students have an understanding about what a control variable is.

05.4 Almost 60% of students gained both available marks in this calculation, with the rest largely scoring zero. A number of students gave an answer of 8 or 12 without working which, despite being within the acceptable range, was not creditworthy without evidence of which numbers had been used to reach the answer.

05.5 Many students struggled with this question, with just under a quarter of students managing to gain any marks. Whilst many spotted the lower concentration, few described the idea of it being lower throughout the investigation. Many did not clearly read the instructions which told them not to refer to when the maximum value occurred. Several students often chose the wrong words to describe an idea, such as using 'steady' or 'gradual', which do not mean the same as slower.

05.6 Over three quarters of students correctly identified that using different concentrations of drug X would enable scientists to find the best dose.