A Level OCR Biology
17 Hormones – answers

Question	Answers	Extra information	Mark	AO Spec reference
1(a)	<table><tr><th>Feature</th><th>Cortex</th><th>Medulla</th></tr><tr><td>secretes steroid hormones</td><td>✓</td><td></td></tr><tr><td>secretes hormones that affect carbohydrate metabolism</td><td>✓</td><td>✓</td></tr><tr><td>secretes noradrenaline</td><td></td><td>✓</td></tr><tr><td>located on the outside of the adrenal glands</td><td>✓</td><td></td></tr></table>	One mark per correct row	4	AO1 5.1.4(b)
1(b)	Any five from: (adrenaline) binds to receptor on cell surface membrane ✓ activates adenyl cyclase ✓ ATP converted to cAMP ✓ cAMP is a second messenger ✓ cAMP activates / other enzymes ✓ cascade effect ✓ glycogen converted to glucose ✓		5 max	AO1 5.1.4(b) 5.1.5(j)
1(c)	steroid hormones are non-polar / hydrophobic ✓ (and can therefore pass through) hydrophobic / non-polar fatty acid / hydrocarbon tails (of phospholipid bilayer) ✓		2	AO2 2.1.5(d)(i) 5.1.4(a)
1(d)(i)	ribosome(s) / rough ER ✓		1	AO2 2.1.3(g)
1(d)(ii)	binds to (cell surface membrane) receptor ✓ *idea of* stimulates second messenger response ✓		2	AO2 5.1.4 (a)
2(a)	islets of Langerhans / beta **and** alpha cells ✓ endocrine ✓ beta cells secrete insulin ✓ alpha cells secrete glucagon ✓ *idea of* homeostatic role / regulation of blood glucose concentration ✓		Max 4	AO2 5.1.4(c)(i) 5.1.4(c)(ii) 5.1.4(d)

OXFORD Revise

Question	Answers	Extra information	Mark	AO Spec reference
2(b)	0.04 m / 500 = 0.00008 m ✓ 80 µm ✓	Accept 0.00008 m If final answer is incorrect, award one mark for evidence of image size / magnification	2	AO2 2.1.1(e) 5.1.4(c)(ii)
3(a)	**E B F A D G C H** ✓✓✓✓	If the order is incorrect, award one mark for each of the following: • **E** first and **H** last • **A** before **C** • **B** and **F** and **D** in the correct order	4	AO1 5.1.4(d)
3(b)	**Level 3 (5–6 marks)** Describes the roles of the pancreas and the liver, with no/few errors or omissions. *There is a well-developed line of reasoning, which is clear and logically-structured and uses scientific terminology at an appropriate level. All the information presented is relevant and forms a continuous narrative.* **Level 2 (3–4 marks)** Describes the roles of the pancreas and the liver, with some errors and/or omissions. *There is a line of reasoning presented with some structure and use of appropriate scientific language. The information presented is mostly relevant.* **Level 1 (1–2 marks)** Describes aspects of the roles of the pancreas or the liver, with major errors and/or omissions. *The information is communicated with only a little structure. Communication is hampered by the inappropriate use of technical terms.* **0 marks** No response or no response worthy of credit.	**Indicative content**: *pancreas* • Alpha cells detect reduction in glucose concentration • Ref. to negative feedback • Glucagon secreted • Less/no insulin secreted *liver* • Glucagon binds to receptors on liver cells • Gluconeogenesis described • Glycogenolysis described Glucose diffuses into the blood to raise blood glucose concentration	6	AO1 5.1.4(d)

Question	Answers				Extra information	Mark	AO Spec reference
4(a)		**Feature**	**Type 1 diabetes**	**Type 2 diabetes**	One mark per correct box for row 1	5	AO1 5.1.4(e)
		cause	genetic / autoimmune response / beta cell destruction	effector cells become less responsive / diet / genetics **AND** environment			
		typical age at onset	childhood	adulthood	One mark for correct row 2		
		usual treatment	insulin injections	*idea of* dietary control	One mark per correct box for row 3		
4(b)	Any three from: *idea of* more genetic influence on the development of type 1 (than type 2) ✓ *idea that* (in some cases) type 1 can be caused by an environmental factor (e.g., viral infection) ✓ poor (named) diet / obesity / lack of physical activity associated with type 2 ✓ *idea that* genetics can influence development of type 2 ✓ *idea that* many different genes can cause (either type of) diabetes ✓					3 max	AO1 5.1.4(e)
4(c)	type 2 usually develops in adulthood / later in life ✓					1	AO2 5.1.4(e)
4(d)	insulin injections ✓ *idea of* regulating diet / weight loss / not being obese ✓					2	AO2 5.1.4(e)
4(e)	75% or 3 in 4 chance ✓					1	AO2 6.1.2bi

Question	Answers	Extra information	Mark	AO Spec reference
5	**Level 3 (5–6 marks)** Describes the treatments for both types of diabetes, including future treatments, with no/few errors or omissions. *There is a well-developed line of reasoning, which is clear and logically-structured and uses scientific terminology at an appropriate level. All the information presented is relevant and forms a continuous narrative.* **Level 2 (3–4 marks)** Describes the treatments for both types of diabetes, with some errors or omissions, and with mention of future treatments. *There is a line of reasoning presented with some structure and use of appropriate scientific language. The information presented is mostly relevant.* **Level 1 (1–2 marks)** Describes treatments for diabetes, with major errors or omissions. *The information is communicated with only a little structure. Communication is hampered by the inappropriate use of technical terms.* **0 marks** No response or no response worthy of credit.	**Indicative scientific points may include:** *current treatments* *type 1* • insulin injections • GM production of insulin *type 2* • management of diet (with details) • management of lifestyle (with details) *both* • monitoring of blood glucose concentration • Use of biosensors *Future treatments* • stem cell therapy (with details) gene therapy	6	AO1 5.1.4(f)
6(a)(i)	Any three from: *for diabetic* higher baseline / starting concentration ✓ greater increase ✓ slower decrease ✓ does not return to baseline ✓	Accept reverse argument	3 max	AO2 5.1.4(e)

Question	Answers	Extra information	Mark	AO Spec reference
6(a)(ii)	Any three from: *for diabetic* effector / liver cells less responsive ✓ to insulin ✓ less glucose absorbed from the blood ✓ (and) converted to glycogen / fats ✓	Accept reverse argument	3 max	AO2 5.1.4(d) 5.1.4(e)

Skills box answers

Question	Answers
1(a)	1.5 mmol dm^{-3}
1(b)	5.3 mmol dm^{-3}
1(c)	3.4 mmol dm^{-3}
2(a)	0.099
2(b)	0.28
2(c)	0.61
3	no, it would be in valid to predict the curve so far beyond the known values.