

Question	Answers	Extra information	Mark	AO / Specification reference
01.1	any four from: <ul style="list-style-type: none"> • the second student is correct / ovulation takes place on day 14 • increasing follicle stimulating hormone (FSH) level causes maturation of an egg in the ovary • this reaches a peak at day 13 then starts to fall • 1 (to 2) days later the peak in luteinising hormone (LH) • stimulates the release of the egg 		4	AO2 4.5.3.4
01.2	FSH kept low egg does not mature (and therefore not released) or: LH level kept low no ovulation / egg not released		1 1 or: 1 1	AO3 4.5.3.4 4.5.3.5
01.3	progesterone levels need to fall to trigger the uterus lining to break down		1 1	AO3 4.5.3.4

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01.4	<p>for: very effective convenient</p> <p>against: any two from:</p> <ul style="list-style-type: none"> • named side effects such as breast tenderness / headaches / weight gain / bleeding between periods • religious belief – some religions do not allow any form of contraception • no protection against STDs • possible long-term health effects 		1 1 2	AO1 4.5.3.5
02.1	<p>A – pituitary gland B – thyroid gland C – adrenal gland D – pancreas E – ovary</p>		1 1 1 1 1	AO2 4.5.3.1
02.2	<p>secretes several hormones into the blood (in response to a stimulus) these stimulate other glands these release hormones which have the desired effect</p>		1 1 1	AO1 4.5.3.1

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02.3	any six from: <ul style="list-style-type: none"> • if thyroxine level falls, pituitary gland stimulated to release TSH • (increased TSH) stimulates thyroid • to release thyroxine • thyroxine controls metabolic rate • level increases to normal • if level of thyroxine too high, TSH release stops • so no more thyroxine released from thyroid 		6	AO2 4.5.3.1 4.5.3.7
03.1	a constant supply of glucose is needed for respiration to provide energy for all body process / tissue function / otherwise could pass out / die high levels can damage blood vessels / other named condition		1 1 1	AO1 4.5.3.2

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03.2	Type 1			AO1
	<ul style="list-style-type: none"> early onset, usually diagnosed in childhood or teenage years pancreas doesn't produce enough / any insulin 		1	4.5.3.2
	Type 2			1
	<ul style="list-style-type: none"> occurs in older age groups cells around the body are unresponsive to the insulin produced 		1	1
03.3	both are treated with a healthy low-sugar diet / carbohydrate-controlled diet			AO1
	Type 1 treatment requires regular insulin injections			4.5.3.2
	Type 2 treatment involves regular exercise		1	
	often focused on weight loss / reducing obesity	accept Type 2 treatment can involve drugs – taking insulin when required	1	1
03.4	any two from: <ul style="list-style-type: none"> increase tax on unhealthy foods subsidies on healthy foods encourage exercise through promotion / advertising programmes build more / improved sport facilities greater education about risks of Type 2 diabetes / benefits of exercise / healthy diet 	accept any other reasonable suggestion which would reduce Type 2 diabetes	2	AO3 4.5.3.2

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04.1	insulin		1	AO2 4.5.3.2
04.2	any four from: <ul style="list-style-type: none"> • chocolate bar contains sugar • absorbed into blood stream • blood glucose / sucrose levels rise • insulin secreted to cause glucose to be converted to glycogen • stored in liver • reducing blood glucose levels / sugar levels to normal 		4	AO2 4.5.3.2
04.3	if a factor in internal environment increases / decreases changes take place to reduce / increase it and restore original level		1 1 1	AO1 4.5.3.7
05.1	blocked oviduct / not enough FSH produced egg and sperm can't meet / so eggs don't mature / are not released	award 1 mark for reason, 1 mark for linked explanation accept other correct reason and explanation	2	AO1 4.5.3.6
05.2	low sperm count / immotile sperm low chance of a sperm cell travelling far enough to meet egg / can't swim (far enough) to meet egg	award 1 mark for reason, 1 mark for linked explanation accept other correct reason and explanation	1 1	AO1 4.5.3.6

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05.3	<p>any four from:</p> <ul style="list-style-type: none">• the woman is given FSH and LH• to stimulate the maturation of several eggs• eggs are collected from the mother and fertilised by sperm from the father in the laboratory• fertilised eggs develop into embryos• at the stage when they are tiny balls of cells, one or two embryos are inserted into the mother's uterus		4	AO1 4.5.3.6

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05.4	any six from: advantages of IVF: <ul style="list-style-type: none"> • it is a safe procedure • embryos can be screened for genetic diseases • unused eggs can be used for research / donated to other couples disadvantages of IVF: <ul style="list-style-type: none"> • some people suffer side effects from the drugs used • there is a possibility of multiple births • which is dangerous for both mother and unborn babies • risk of ovarian hyper-stimulation syndrome (OHS) • mother suffers emotional and physical stress • success rates are relatively low • success rate decreases with age • embryos that are not used may be destroyed – some people believe this is unethical 	do not allow more than 4 disadvantages	6	AO2 4.5.3.6

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05.5	arguments for: <ul style="list-style-type: none"> allows women who cannot conceive to become pregnant opens the possibility of IVF treatment to those who could not otherwise afford to access it arguments against: <ul style="list-style-type: none"> not offered to all / age of woman dictates if they can receive treatment and also how many cycles less than 1 in 3 chance of success for any woman / decreasing chance of success / success rate as low as 15% by age of 38–39 significant cost – up to £15 000 per patient money spent by NHS on a non-life saving / non-essential procedure could be spent on other procedures / drugs limit to number of treatments offered to an individual based on age / location 		4	AO3 4.5.3.6
06.1	unable to produce insulin / produce too little insulin		1	AO1 4.5.3.2
06.2	blood glucose level increases in both cases blood glucose level increases significantly more in person with Type 1 diabetes		2	AO2 4.5.3.2

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06.3	accept any time between 7–8 am / 12–1 pm / 6–7 pm		1	AO3 4.5.3.2
06.4	140%	accept answer in range 125–171% award 1 mark for blood glucose before in range 70–80 mg/L, after in range 180–190 mg/L	2	AO2 4.5.3.2 MS 1c, 4a
06.5	there is currently no cure; treatment can only be managed with insulin any four from: <ul style="list-style-type: none"> pancreas transplant available not enough donors available / operation carries high risk / patient will need to take immunosuppressant drugs pancreatic cell transplant limited success in trials so far stem cell transplant experimental technique no results yet from research genetic engineering of faulty cells theoretical technique – not yet available 		1 4	AO1 AO3 4.1.2.3 4.5.3.2
07.1	pancreas		1	AO1 4.5.3.2

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07.2	any six from: <ul style="list-style-type: none"> • negative feedback system • if blood glucose concentration is too high, insulin is released • glucose moves into cells to be used • excess glucose converted to glycagon • in liver • blood glucose levels fall • if blood glucose concentration is too low, glucagon is released • causes glycogen to be converted back to glucose • blood glucose levels rise 	marks could be awarded for a fully annotated diagram	6	AO1 4.5.3.2
07.3	UK diabetes rate 5.4% UK rate 57% of the US rate / US rate 1.74× higher than UK rate	award 1 mark for difference = 4%	1 2	AO2 4.5.3.2 MS 1c
08.1	stimulus		1	AO1 4.5.1 4.5.2.1 4.5.3.1
08.2	adrenaline		1	AO1 4.5.3.7

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08.3	<p>similarities</p> <ul style="list-style-type: none"> • both send signals / transmit information around the body • both cause a change in another part of the body • both the endocrine system and the nervous system receive information from sensory receptors <p>differences</p> <ul style="list-style-type: none"> • electrical signals in nerves move more quickly / hormones travel more slowly • hormones are involved with slower, long-term change whereas nerves bring about immediate / rapid responses • hormones move in the blood whereas nerve signals pass along neurones 		6	AO1 4.5.1 4.5.2.1 4.5.3.1
09.1	urea / excess water / excess ions		1	AO1 4.5.3.3
09.2	<p>no glucose or protein in urine</p> <p>(no protein) as protein molecules too large to pass through the membrane / out of the kidney</p> <p>(no glucose) as all is reabsorbed back into the blood by diffusion <u>and</u> active transport</p>		1 1 1 1	AO2 4.5.3.3

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09.3	any four from: <ul style="list-style-type: none"> • lower water content in the blood • more ADH produced • by pituitary gland • increasing the permability of the collecting duct • kidney tubules reabsorb more water • concentrated urine produced 		4	AO2 4.5.3.3
09.4	build-up of toxins / urea which are poisonous to the body or: incorrect water balance / ion concentration cells damaged by osmosis		1 1 or: 1 1	AO1 4.5.3.3

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09.5	<p>dialysis – advantages:</p> <ul style="list-style-type: none"> • machines / equipment available / can start as soon as diagnosed • available to anyone suffering kidney failure (no tissue matching issues) <p>dialysis – disadvantages:</p> <ul style="list-style-type: none"> • requires several hours per day to be spent linked to dialysis machine • lifetime requirement for treatment • diet must be carefully controlled <p>transplant – advantages:</p> <ul style="list-style-type: none"> • permits relatively normal life (no requirement for on-going daily treatment) <p>transplant – disadvantages:</p> <ul style="list-style-type: none"> • shortage of donors (may wait many months / years for availability) • requires tissue match • limited transplant lifespan / body may destroy new kidney, requires taking of immunosuppressant drugs 	to award all 6 marks, answers should address at least one advantage and one disadvantage for both kidney dialysis and kidney transplants	6	AO1 4.5.3.3

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10.1	ethene – control fruit ripening gibberellins – increase fruit size auxins – promote root growth in cuttings	award 2 marks if all three correct award 1 mark if one or two correct	2	AO1 4.5.4.1 4.5.4.2
10.2	leaves have a larger surface area so more weedkiller / auxin is absorbed		2	AO1 4.5.4.2
10.3	advantage: <ul style="list-style-type: none"> fewer weeds so less competition with wheat so wheat grows larger / more quickly / so same yield of wheat crop produced more cheaply disadvantage: <ul style="list-style-type: none"> other plant species nearby may be affected so less biodiversity in areas around fields 	to award 4 marks, answer should include an explanation linked to the advantage and disadvantage accept other reasonable suggestions with linked explanations	1 1 1 1	AO3 4.5.4.2

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11.1	<p>any four from:</p> <ul style="list-style-type: none">• use of scissors to cut tips from some shoots / cut hole in box• use of forceps for handling seedlings• use of ruler to measure lengths of shoots at start and at end• other factors controlled, e.g. temperature / availability of water• use of lamp + box to provide one-sided lighting• repeat each treatment at least three times• place control in total darkness and / or all-round light• time taken to view response every several hours for a few days	to award 4 marks, a method to produce valid data should be suggested	4	AO2 4.5.4.1

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11.2	any six from: <ul style="list-style-type: none"> • side of tip exposed to light will grow towards light • auxin is distributed unequally / there is more hormone on the dark side • this causes greater rate of growth on dark side • response is phototropism • shoots with tip removed will remain vertical • auxin is not present to respond to the light • control (exposed to light from all directions or exposed to no light) will remain vertical 		6	AO2 4.5.4.1
12	diuretic enters the blood stream affects pituitary gland less ADH produced collecting tubule less permeable less water reabsorbed into blood (so more in urine)		1 1 1 1 1	AO3 4.5.3.3
13.1	carbohydrates are made up of many / more than one sugar molecule(s) joined together		1	AO2 4.2.2.1
13.2	it speeds up the breakdown of sucrose (into glucose and fructose) without being used up		1 1	AO2 4.2.2.1

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13.3	invertase has to bind to sucrose at active site sucrose has a complementary shape which fits into the binding site		1 1 1	AO2 4.2.2.1
13.4	as fructose / glucose is sweeter, the chocolates could contain less sugar chocolate would therefore contain less energy / would cause less weight gain		1 1	AO3 4.2.2.1
14.1	bacteria		1	AO2 4.3.1.1
14.2	ribosomes		1	AO1 4.6.1.5
14.3	any four from: <ul style="list-style-type: none"> • bacterial cell wall contains protein • faulty cell wall could result in damage from osmosis • cell could burst • no enzymes could be produced • cell could not respire • proteins are needed for growth / repair • bacterium could not mend any damage 	accept any sensible suggestions	4	AO3