AQA GCSE Biology

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
01.1	any **four** from: • first select plants that produce a high yield of tomatoes, and that produce sweet tomato fruits • cross-pollinate the plants / breed plants • use the seeds from the fruits of the plants produced to grow new plants • select again from these plants to further select for high-yielding plants with sweet-tasting tomatoes • continue over several generations		4	AO2 4.6.2.3
01.2	any **two** from: • crops all have similar characteristics, so customers will return for more (known) product • greater mass of tomatoes produced so more profit • more fruit produced per plant means less land required to produce same number of tomatoes • sweeter tomatoes more in demand so higher price can be charged	to award 4 marks, answers should include two suggestions with linked reasons do not accept simply 'higher yield' accept other reasonable suggestion with linked reasoning for two marks	4	AO3 4.6.2.3
01.3	disease resistance / pest resistance because a natural resistance would be required as no use of fungicides / pesticides / artificial chemicals will be permitted		1 1	AO3 4.6.2.3

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02.1	bar chart drawn all bars plotted to ±1 mm tolerance	ignore any best fit line added award 2 marks for all bars correct, 1 mark for 3 bars correct	1 2	AO2 4.6.2.1 MS 2c, 4a, 4c
02.2	genetic and environmental for a person to reach their potential (inherited) height, they must eat an appropriate diet		1 1	AO2 4.6.2.1
02.3	midpoints 110, 130, 150, 170, 190 midpoint number of students: 1320, 2340, 5400, 3740, 1140 mean = $\frac{13940}{94}$ = 148 cm		1 1 1 1	AO2 4.6.2.1 MS 2b, 2f
02.4	agree – shape approximately corresponds to expected normal (population) distribution disagree – actual heights are lower than those for the whole population		1 1	AO3 4.6.2.1

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03.1	height – mostly genetic / little effect due to environment		1	AO2
	reason: little variation between identical twins (same genes) brought up in same and in different environments / large difference between non-identical twins (different genes) in same environment		1	4.6.2.1
	mass – no conclusion can be formed / equally affected by genes and environment		1	
	reason: large variation between identical twins (same genes) in different environment and large variation between non-identical twins (different genes) in same environment		1	
	IQ: mostly environment / little difference due to genes		1	
	reason: little variation between identical twins (same genes) in same environment / little difference between non-identical twins (different genes) in same environment and large difference in identical twins (same genes) brought up in different environment		1	
03.2	use a larger sample size		1	AO3
	include other groups who would share the same characteristics, e.g. triplets (same genes), siblings (same environment)		1	4.6.2.1
04.1	new genes introduced / DNA modified		1	AO1
	to give desired traits		1	4.6.2.4

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04.2	C > E > D > A > B	award 3 marks for 3 correct 2 marks for 2 correct 1 mark for 1 correct	4	AO1 4.6.2.4
04.3	any **one** from: • quicker (than selective breeding) / only takes one generation • can be sure of trait becoming present in crop		1	AO2 4.6.2.4
05.1	selection: • higher milk yield / better quality milk / bigger body mass / more meat / better quality meat breeding process – any **three** from: • (cattle) with desired characteristics mated / bred • offspring with desired traits selected • bred / mated again • repeated over many generations		1 3	AO2 4.6.2.3

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Question	Answers	Extra information	Mark	AO / Specification reference
05.2	for: • increased yield • reduced use of pesticides / fungicides / artificial chemicals • no known negative health effects on humans against: • genes may end up in / affect non-targeted organisms • unknown long-term human health effects • genes may mutate with unknown effects	accept other reasonable arguments for or against GM crops allow no more than three reasons for or three reasons against genetic engineering	4	AO3 4.6.2.4
06.1	reduces blood glucose / sugar levels by causing glucose to move into the cells / to be converted into glycogen		1 1	AO1 4.5.3.2
06.2	any **six** from: • insulin gene identified / located / isolated • cut out using enzymes • plasmid ring cut using enzyme • gene inserted into plasmid • plasmid put into bacteria • bacteria reproduce • insulin gene switched on • insulin harvested		6	AO2 4.6.2.4

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06.3	any **two** from: • pigs do not need to be killed • bacteria require far less space to culture • large quantities can be produced, more quickly • lower cost • ethical / religious reasons	accept any other reasonable suggestions	2	AO3 4.6.2.4
07.1	74		1	AO2 4.6.2.1 MS 2b, 2f
07.2	(+/–) 10 cm^2	award 1 mark for calculation of range = 20	2	AO2 4.6.2.1
07.3	only looked at samples from two locations rule for these plants may not apply to other plants uncertainty of shaded leaf surface area was larger than the difference between the results so the true value for shaded leaves may be smaller than for unshaded leaves		1 1 1 1	AO2 4.6.2.1 MS 2d

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Question	Answers	Extra information	Mark	AO / Specification reference
07.4	any **one** from: • convert complex shape into approximate simple shapes, e.g. rectangles and triangles – measure and calculate surface area of these shapes • measure mass of leaves. assume same thickness, mass will be proportional to surface area	accept other reasonable suggestion	1	AO3 4.6.2.1
08.1	enzyme		1	AO2 4.6.2.4

Question	Answers	Extra information	Mark	AO / Specification reference
08.2	any **six** from: **advantages**: • enables a previously incurable disorder to be cured • only requires single procedure (versus on-going management / treatment) • offers the potential for no side effects / no on-going drug treatments **disadvantages**: • injection of a vector / bacteria / virus may cause infection / side effects • gene therapy may cause cancer / uncontrolled cell growth • some people have religious objections to altering genes • high cost may make treatments only available to the wealthy • long-term effects on the patient are unknown		6	AO3 4.6.2.4

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Question	Answers	Extra information	Mark	AO / Specification reference
09.1	any **two** from: • longer growing season • energy saved not heating a greenhouse • money saved not heating a greenhouse • greater variety of locations in which the tomatoes can be grown	accept any other reasonable suggestions	2	AO3 4.6.2.4
09.2	any **six** from: • gene that codes for antifreeze chemical located • cut out using an enzyme • placed into a vector • vector is a bacterium or a virus • plant infected with vector • transfers gene into tomato plant • at an early stage of development • tomato plants produced have frost-resistant properties		6	AO2 4.6.2.4
10.1	differences in the characteristics of individuals within a population		1	AO1 4.6.2.1
10.2	fur colour / eye colour / number of spots		1	AO2 4.6.2.1

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Practice answers

OXFORD Revise

Question	Answers	Extra information	Mark	AO / Specification reference
10.3	size / height / body mass puppies have the potential to grow to a certain size, but their size is also affected by how much they eat		1 1	AO2 4.6.2.1
10.4	raised likelihood of genetically inherited disorders / defects / health problems / reduction in genetic diversity / increased chance of inbreeding		1	AO1 4.6.2.3
11.1	offspring genetically identical to parent		1	AO1 4.6.2.5
11.2	selective breeding		1	AO1 4.6.2.5
11.3	small tissue sample taken from parent plant tissue grown (in agar) with nutrients and plant hormones many identical plant cells / callus produced cells stimulated by hormones to produce many (tiny) plants / plantlets		1 1 1 1	AO1 4.6.2.5
11.4	advantage (any **one** from): • large numbers of plants produced from small quantity of plant material • characteristics of parent plant maintained disadvantage (any **one** from): • lack of genetic diversity • expensive	accept other advantage / disadvantage	1 1	AO2 4.6.2.5

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Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
12.1	when a whole new animal is produced from one cell of another adult animal		1 1	AO1 4.6.2.5
12.2	save animals from extinction / bring back species that have become extinct / clone pets or prized animals	accept any other suitable suggestion	1	AO1 4.6.2.5
12.3	any **five** from: • nucleus is removed from an unfertilised sheep egg cell • nucleus from an adult body cell is taken from the sheep they wished to clone • nucleus is inserted into the egg cell • an electric shock is used to stimulate the egg to divide • egg divides to form an embryo • embryo is inserted into the uterus of a female sheep • cloned sheep continues to develop and is born naturally		5	AO2 4.6.2.5
13.1	lipase digests lipids / fats into fatty acids the fatty acids decrease the alkalinity / pH of the milk solution when the pH drops below 8 the indicator changes colour from pink to colourless		1 1 1	AO2 4.2.2.1

Question	Answers	Extra information	Mark	AO / Specification reference
13.2	0.0059 0.0091	accept working for 1 mark	3	AO2 4.2.2.1 MS 1c
13.3	lipase denatured active site changed shape so substrate / lipid molecule unable to bind to it		1 1 1	AO2 4.2.2.1
13.4	points plotted to ±1 mm tolerance smooth best-fit curve through points accept optimum temperature in range 35–37 °C		1 1 1	AO2 4.2.2.1 MS 4a, 4c
13.5	increasing temperature increases kinetic energy of the molecules collisions between substrate and active site occur more regularly more collisions between substrate and active site are successful / cause reaction		1 1 1	AO2 4.2.2.1

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Question	Answers	Extra information	Mark	AO / Specification reference
13.6	any **four** from: • carry out repeats of each temperature • to identify anomalies / increase accuracy by reducing effect of random error • complete more results around the optimum temperature • to improve accuracy of exact optimum point • use colorimeter • to determine reaction end point more accurately	to award 4 marks, answer should include two appropriate suggestions with linked explanations of how the experiment would be improved accept other reasonable suggestion with linked explanation do not accept use a wider range of temperatures	4	AO3 4.2.2.1
14.1	any **two** from: • ribosomes – produce proteins / site of protein synthesis • cell membrane – controls which substances move into and out of a cell • cytoplasm – where most of the chemical reactions in a cell take place	allow 1 mark for a correctly named structure and 1 mark for a correctly linked description, for a maximum of **two** structures	4	AO1 4.1.1.2
14.2	1500		1	AO2 4.1.1.2

Question	Answers	Extra information	Mark	AO / Specification reference
14.3	the more mitochondria a cell has, the more energy it is able to release any **two** from: • energy is released to the cell by respiration • muscle cells need energy to contract • small intestine cells need energy to actively transport nutrients / glucose into the blood stream • skin cells do not require much energy		1 2	AO2 4.1.1.2 4.1.1.3