

AQA Style

GCSE

COMBINED SCIENCE

Higher Tier

Biology Paper 2

H

Mark Scheme



Question 1

Question	Answers	Extra information	Mark
01.1	a different form/version of a gene		1
01.2	when a person has two copies of the allele or when there is no dominant allele present		1
01.3	correct parental gametes (male h and h, female H and h) correct derivation of offspring from given gametes offspring with genotype hh are circled/ underlined or identified in some way as having haemochromatosis probability = 0.5	If students have used different letters to represent the alleles, they must have clearly stated which allele each letter represents Allow ecf from diagram. Allow 50% / $\frac{1}{2}$ / 1 in 2 / 1:1 Do not allow 1:2	1 1 1 1



01.4	Level 2: Some logically linked reasons are given with at least one benefit to each method. For full marks there should also be a simple judgement.	3-4
	Level 1: Relevant points are made. They are not logically linked. Two relevant points awards two marks.	1-2
	No relevant content.	0
	Indicative content: Benefits of preimplantation genetic diagnosis: <ul style="list-style-type: none">• No (or less) chance of miscarriage as a result of the procedure.• Does not involve abortion/less pain or suffering for parents/ ethical reason against abortion.• Detected earlier so less chance for the embryo to have developed/reference to 3 days instead of 10 weeks.• Multiple embryos mean a higher chance of having an unaffected embryo.• Spare embryos mean you won't need to repeat the full procedure for a second child. Benefits of chorionic villus sampling: <ul style="list-style-type: none">• Lower cost to the NHS.• If the embryo is healthy or parents decide not to terminate, there will be no embryos destroyed.• Lower risk of false-positive result.	
Total		10



Question 2

Question	Answers	Extra information	Mark
02.1	Level 3: The method includes counting the number of plants and measuring the light intensity in more than one location. For full marks students must also include another valid statement.		5-6
	Level 2: The method includes counting the number of plants or measuring the light intensity on more than one location. For four marks the students must also include another valid statement.		3-4
	Level 1: The method includes counting the number of plants or measuring the light intensity in at least one location. Two marks can be given for two valid statements.		1-2
	No relevant content.		0
	Indicative content: <ul style="list-style-type: none">• Use of a tape measure to produce a transect down the hillside.• Quadrats placed;<ul style="list-style-type: none">• at regular locations along the transect.• Counting of the number of daisies in the quadrat.• Use of the light meter to measure light intensity in each quadrat.• Repetition of transect.• Repetition of light intensity measurement in each quadrat.• Calculation of the mean light intensity in each quadrat.• Calculation of the mean number of daisies in each light intensity.• Relate the light intensity to the number of daisies e.g. graph.		



02.2	grass		1
02.3	to make glucose (by photosynthesis)	Allow convert light energy to chemical energy.	1
02.4	when the rabbit population is high, there is a lot of food available for the foxes	Explanation may start from any point in the cycle.	1
	the number of foxes increases	Allow predator for fox and prey for rabbit.	1
	the foxes eat the rabbits so the rabbit population falls		1
	there is less food available for the foxes so the fox population falls		1
Total			12



Question 3

Question	Answers	Extra information	Mark
03.1	receptor relay neurone motor neurone	Answers in this order only.	1 1 1
03.2	Any two from: <ul style="list-style-type: none">• chemical/neurotransmitter/ transmitter• passes the impulse from one neurone to the next• by diffusing (across the gap/synapse)		2
03.3	automatic/quick/fast/rapid response to protect the body/to protect from danger		1 1
03.4	12 (cm)		1
03.5	caffeine decreases reaction times	Allow caffeine speeds up reactions.	1
03.6	Any two from: <ul style="list-style-type: none">• use a better method for measuring reaction time (e.g. computer reaction timer)• more repeats of each test• repeat the test with more people• use the same distance between finger and thumb• use a ruler with a more precise scale (e.g. mm scale)	Ignore accurate.	2
Total			11



Question 4

Question	Answers	Extra information	Mark
04.1	nucleus		1
04.2	fertilisation		1
04.3	23	Answers in this order only.	1
	46		1
04.4	a change in a gene/DNA		1
04.5	<p>Any four from:</p> <ul style="list-style-type: none">• variation within the population in size or number of fat storage/mounds/humps• mutation results in a second hump/mound or more fat storage• little food available in the desert or could be days between finding food• reference to natural selection in the correct context• camels with the larger/most humps were most likely to survive in the environment• these camels would pass genes/alleles for the large/extra humps to the next generation		4
Total			9



Question 5

Question	Answers	Extra information	Mark
05.1	11.5 (mmol/L)	Allow answers in the range of 11.4 to 11.6.	1
05.2	0.5 (hours)		1
05.3	insulin		1
05.4	the pancreas produces (the hormone) <u>glucagon</u> which causes glycogen to be converted into glucose and released into the blood		1 1
05.5	in Type 1 diabetes, not enough/no insulin is produced in Type 2 diabetes, the body cells no longer respond/are less responsive to insulin Type 1 diabetes is treated with insulin injections Type 2 diabetes is treated with a carbohydrate-controlled diet and/or exercise	Diet unclarified is not sufficient for the mark.	1 1 1
05.6	Any one from: adrenaline thyroxine	Allow any other correctly named hormone that is controlled by negative feedback.	1
Total			10



Question 6

Question	Answers	Extra information	Mark
06.1	enzymes cut out the required gene from the daffodil		1
	the gene is inserted into a vector/ bacterial plasmid/virus		1
	the vector is used to insert the gene into the cells of the rice plant		1
	at an early stage of its development		1
06.2	Any two from: <ul style="list-style-type: none">• genetically modified crops could affect populations of wild plants and insects• the effects of eating GM crops/golden rice on human health were unknown/ were not fully explored• genetic engineering is unethical/ unnatural		2
Total			6



Question 7

Question	Answers	Extra information	Mark
07.1	FSH causes maturation of an egg (in the ovary)		1
	LH stimulates the release of an egg		1
07.2	13		1
07.3	oestrogen levels increase which stimulates the release of LH		1
	progesterone levels increase which inhibits the release of LH		1
07.4	oestrogen and progesterone maintain the uterus lining		1
	when they are at their lowest levels, the uterus lining is shred/lost/no longer maintained		1
07.5	eggs are collected (from the mother)		1
	eggs are fertilised with sperm (from the father) <u>in the laboratory</u>	There must be a reference to fertilisation occurring outside the mother in a laboratory/petri dish/test tube or equivalent.	1
	the fertilised eggs develop into embryos		1
	one or two embryos are inserted into the mother's uterus/womb		1
07.6	Any one from: <ul style="list-style-type: none">• it is emotionally and/or physically stressful• the success rates are not high• it can lead to multiple births which are a risk to both the babies and the mother		1
Total			12