GCSE Biology (AQA 8461)

Foundation Tier

Mark scheme

Introduction

The information provided for each question is intended to be a guide to the type of answers students may produce, but can be neither exhaustive nor prescriptive. Award marks according to your professional judgement for all appropriate responses.

Disclaimer

- These mark schemes and exemplar answer content are entirely the work of the question author and have not been produced by, reviewed by or endorsed by AQA.
- Where marks are suggested and levels mapped to particular styles or features of answers, these are intended for guidance only and cannot reflect the full examination marking process, which involves moderation and alignment of level boundaries across a full, national student cohort that cannot be determined from a standalone product such as this set of Practice Papers.
- Therefore, mark allocation, mark totals, suggested levels and overall assessments of performance as found in these Practice Papers and Mark Schemes represent only a limited guide to possible outcomes, and are not a reliable indicator of actual performance.

Information for teachers

1. General

The mark scheme for each question gives:

- the marks available for each part of the question
- the total marks available for the question
- the correct answer or, if multiple correct answers are possible, a typical correct answer with variations
- extra information to help with making decisions about how many marks to award
- the Assessment Objective(s) from the GCSE Specification that the part question is intended to cover.

The 'extra information' is aligned to the appropriate answer and is only intended for consideration with that particular part of the answer.

2. Marking of lists

For question parts where a set number of responses is requested, all possible correct answers are stated. Each correct response should be awarded a mark as indicated, up to a maximum for the question part as stated on the question paper and as written in this marks scheme.

If a student has provided more than the set number of responses requested, the principle to be followed is that 'right + wrong = wrong'. Each error or contradictory response negates each correct response. If the number of errors and contradictions equals or exceeds the number of correct responses, no marks can be awarded for that part of the question.

3. Use of symbols and formulae

If an accepted scientific symbol or formula is written instead of a required chemical name or unit, award full marks if the symbol or formula is correct and if, in the context of the question, the response is appropriate.

4. Calculations

Award marks for each correctly completed stage of a calculation, as students are instructed to show their working.

Full marks can be given for a correct numerical answer (including units), even though no working is shown.

5. Interpretation of 'it' and 'them'

Answers using the word 'it' or 'them' should be awarded marks only if it is clear that the 'it' or 'them' refers to the correct subject.

6. Errors carried forward

An error in the answers to a structured question should be penalised once only.

Allowances for errors carried forward are usually restricted to calculation questions. Where such allowances are permissible, the mark scheme includes a statement such as 'allow ecf'.

7. Phonetic spelling

The phonetic spelling of correct scientific terminology should be awarded marks unless there is a possible confusion with another technical term.

8. Brackets

(……) in this marks scheme indicates information that is not essential for a mark to be awarded, but is included to help you identify the sense of the required answer.

9. Ignore / insufficient / do not allow

'Ignore' or 'insufficient' are used in this marks scheme to indicate information that is irrelevant to the question or not enough to gain the mark. Further correct amplification could gain the mark.

'Do not allow' indicates that this is a wrong answer which, even if the correct answer is also given, still means that the mark should not be awarded.

'Level of response' marking instructions

'Level of response' mark schemes are broken down into levels, each of which is given a descriptor. The descriptor for a level shows the average performance for that level. There are marks allocated to each level.

Before applying the mark scheme to a student's answer, read through the answer and annotate it to show the qualities that are being looked for. Then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a 'ladder' to see whether the answer meets the qualities given in the descriptor for that level. If the answer meets the lowest level, move up to the next level and repeat the assessment until you find a match between the descriptors and the answer.

When assigning a level, you should look at the overall quality of the answer and not be distracted by small details of the answer where the student may not have performed quite as well as their overall performance. If an answer covers different aspects of different levels of the mark scheme, use a 'best fit' approach: for example, if a response is predominantly level 2 with a small amount of level 3 material, place it in level 2 but award a mark near the top of the level because of the level 3 content.

Step 2 Determine a mark

The descriptors within each level can help with this, along with the exemplar answers or extra information given. Indicative content is provided as a guide. It is not exhaustive and you should credit other valid points in the answer. Students do not have to cover all of the points mentioned in the indicative content to reach the highest level of the mark scheme.

Ignore any responses that are irrelevant. However, only award full marks if there are no incorrect or contradictory responses.

An answer that contains nothing of relevance to the question must be awarded no marks.

Read back through the full answer as you apply the mark scheme, so as to clarify points and assure yourself that the level and the mark are appropriate.

Paper 1

Question 01

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
01.1	Arteries carry blood away from the heart		1	AO1/1 4.2.2.2
01.2	Pulmonary vein		1	AO1/1 4.2.2.2
01.3	44 mm/s		1	AO2/1 4.2.2.2
01.4	glucose oxygen		1 1	AO1/1 4.4.2.1
01.5	Stent opens / re-opens the (coronary) artery and allows blood to flow freely		1	AO1/1 4.2.2.4
01.6	Any **three** of the following points: • In 25–44 age group more men have high/ above 5 units cholesterol • As age increases more women have high / above 5 units cholesterol • In 45–64 age group numbers of men and women with high / above 5 units cholesterol are similar • In 65–74 age group more women than men have high / above 5 units cholesterol	Look for the ideas in these points clearly expressed. Note that the graph does **not** show an increase in cholesterol with each age group.	3	AO3/2b 4.2.2.4
01.7	Any **two** of the following points: • reduce fatty foods in diet • lose weight/ do not get overweight or obese • keep active • do not smoke • take statins		1 1	AO1/1 4.2.2.4 AO2/2 4.2.2.6
TOTAL			**11**	

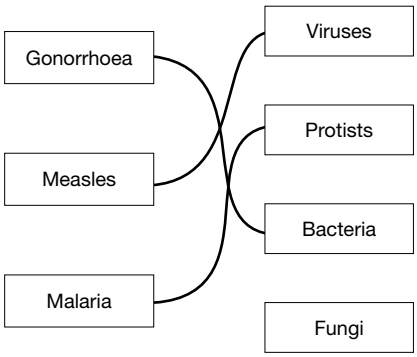
Question 02

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
02.1	Amino acids		1	AO1/1 4.2.2.1
02.2	To keep the pH constant	accept to keep pH 7	1	AO1/1 4.2.2.1
02.3	Use a thermometer in the water bath to record temperature		1	AO2/2 4.2.2.1
02.4	°C 205.0	 accept 205	1 1	AO1/1 4.2.2.1
02.5	More kinetic energy so more collisions		1	AO3/1a 4.2.2.1
02.6	Do the experiment at 35 °C, 40 °C and 45 °C		1	AO3/3b 4.2.2.1
02.7	**Level 2:** A detailed and coherent plan covering all the major steps is provided. The method is set out logically taking into account control variable and appropriate measurements. The plan could be repeated by another person to determine the effect of pH on breakdown of casein in skimmed milk by the enzyme trypsin.		3–4	AO1/1 4.2.2.1
	Level 1: Simple statements relating to relevant apparatus or steps are made but they may not be in a logical order. The plan would not allow another person to determine the effect of pH on breakdown of casein in skimmed milk by the enzyme trypsin.		1–2	
	No relevant content.		0	
	Indicative content • range of at least 3 pH values / use of buffer solutions • control variables / keep volume of skimmed milk and trypsin the same • keep temperature the same using water bath • time how long it takes for milk to go clear at each pH • do repeats at each pH			
TOTAL			**11**	

Question 03

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
03.1	Cell wall – F Vacuole – A		2	AO1/1 4.1.1.2
03.2	Chloroplasts		1	AO1/1 4.1.1.2
03.3	Length of X–Y measured in mm Figure from above multiplied by 1000 Figure given above in µm divided by 11	Figure will depend on final size of diagram. Any error in measuring can be ignored for this mark.	1 1 1	AO2/2 4.1.1.5
03.4	DNA in a loop in the cytoplasm		1	AO1/1 4.1.1.1
03.5	2.4 (µm)		1	AO2/2 4.1.1.1
TOTAL			**8**	

Question 04

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
04.1		Take off one mark for each incorrect or extra line.	3	AO1/1 4.3.1.3, 4.3.1.2, 4.3.1.5
04.2	vomiting diarrhoea		1 1	AO1/1 4.3.1.3
04.3	three correct plots and correctly drawn bars	Take off 1 mark for each incorrect plot.	3	AO2/2 4.3.1.3
04.4	Between 2011 to 2014 there is a fall in number of cases each year/ number of cases falls from 15.0 to 12.5 (cases per 100 000 of population) In 2015 number of cases increases / returns to same as 2011/ back to 15.0 (cases per 100 000 of population)	Note question asks for a description of the graph, not an explanation of the disease.	2	AO3/1a 4.3.1.3
04.5	Allows comparison … … between different years … … as size of population may change		1 1 1	AO3/1b 4.3.1.3
TOTAL			**13**	

Question 05

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
05.1	energy is released	Allow 'heat is released'. Reject 'energy is made'.	1	AO1/1 4.4.2.1
05.2	to show carbon dioxide is being produced by the maggots		1	AO2/2 4.4.2.1
05.3	control experiment		1	AO2/2 4.4.2.1
05.4	limewater in tube A is milky limewater in tube B is clear		1 1	AO2/2 4.4.2.1
05.5	lactic acid	Accept lactate	1	AO1/1 4.4.2.1
05.6	16.1 ÷ 0.8 = 21 21 times		1	AO2/2 4.4.2.1
TOTAL			**7**	

Question 06

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
06.1	so each daughter cell will have the sub-cellular structures		1	AO1/1 4.1.2.2
06.2	they replicate to form two copies of each chromosome		1	AO1/1 4.1.2.2
06.3	growth repair (of tissues)	Reject 'to repair cells'	2	AO1/1 4.1.2.2
06.4	benign tumours are contained in one area, usually within a membrane *or* benign tumours do not invade other parts of the body *and* malignant tumour cells invade neighbouring tissues *or* malignant tumour cells spread to different parts of the body (where they form secondary tumours)	To gain 2 marks, students must make one comment about *each* type of tumour.	2	AO1/1 4.2.2.7
TOTAL			**6**	

Question 07

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
07.1	8		1	AO2/1 4.1.3.1
07.2	suitable scale on *y*-axis 3 points plotted correctly correctly drawn line	Scale should allow accurate plotting. All three points to be correct for 1 mark. Points should be joined with straight lines.	1 1 1	AO2/2 4.1.3.1
07.3	As the length of side of the cube increases the surface area to volume ratio decreases.	Reject references to 'directly proportional'.	1	AO3/1a 4.1.3.1
07.4	The smaller the surface area to volume ratio the longer it takes for the cube to change colour completely.	Reject references to 'directly proportional'.	1	AO3/1a 4.1.3.1
07.5	The organism has a large surface area to volume ratio so oxygen can reach the centre of cell quickly by diffusion.	Allow: other materials that enter cells instead of oxygen.	1	AO3/2b 4.1.3.1
07.6	provide large surface area for gas exchange	Allow description of gas exchange.	1	AO3/2b 4.1.3.1
07.7	Any **three** from the following: • biconcave disc shape gives large surface area to volume ratio • small size to travel through capillaries • haemoglobin to carry oxygen • lack of nucleus (so) more room (for haemoglobin)	Allow description of biconcave disc.	3	AO1/1 4.2.2.3
TOTAL			**11**	

Question 08

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
08.1	so water cannot evaporate from the soil or pot	Idea that only water *loss* from plant is being measured.	1	AO2/2 4.2.3.2
08.2	12 ÷ 30 = 0.4		1	AO2/2 4.2.3.2
08.3	Any **two** from: • temperature • light intensity • room humidity • air movement		2	AO3/3b 4.2.3.2
08.4	rate of water loss will decrease as water (vapour) cannot evaporate from the leaves (via stomata)	Accept any sensible answer that shows the student knows that water loss occurs via the stomata.	1 1	AO3/2a 4.2.3.2
TOTAL			**6**	

Question 09

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
09.1	translocation		1	AO1/1 4.2.3.2
09.2	phloem is composed of tubes of elongated cells with pores in the end walls cell sap can move from one phloem cell to the next		1 1 1	AO1/1 AO2/1 4.2.3.2
09.3	starch is insoluble so it does not affect osmosis	Accept 'is not washed out of cells'.	1 1	AO1/1 4.4.1.3 AO2/1 4.1.3.2
09.4	add iodine solution blue/black colour is positive test for starch		1 1	AO2/2
TOTAL			**8**	

Question 10

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
10.1	so roots can respire	Reject mention of respiration on its own.	1	AO2/1 4.4.2.1
10.2	active transport		1	AO1/1 4.1.3.3
10.3	chlorosis / yellow leaves		1	AO1/1 4.3.3.1
10.4	to make amino acids / proteins		1	AO2/1 4.3.3.1
10.5	**Level 2:** A detailed and coherent explanation is provided. The student makes logical links between clearly identified, relevant points that explain why plants with magnesium and nitrate ion deficiency have reduced yields.		3–4	AO2/1 4.3.3.1
	Level 1: Simple statements are made, but not precisely. The logic is unclear.		1–2	
	No relevant content.		0	
	Indicative content • less photosynthesis because of lack of magnesium to make chlorophyll • therefore less glucose made *so* • less energy released for growth • because glucose is needed for respiration *and / or* • less amino acids / proteins / because of lack of nitrogen/ nitrate • less growth because amino acids / proteins are needed for growth			
TOTAL			**8**	

Question 11

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
11.1	To prevent microorganisms / bacteria getting into the milk	Accept pathogens, reject 'dirt' or 'germs'.	1	AO2/2 4.1.1.6
11.2	Count the number of colonies on each plate Plate with fewest colonies is from most effective treatment		1 1	AO3/2a 4.1.1.6
11.3	**Level 3:** A clear, logical and coherent answer, with no significant redundancy. The student understands the process and describes aseptic procedures in a logical order.		5–6	AO1/2 4.1.1.6
	Level 2: A partial answer with some stages missed or not in logical order.		3–4	
	Level 1: One or two relevant points but little linkage of points or logical order.		1–2	
	No relevant content.		0	
	Indicative content • wash hands before starting work • disinfect work surfaces • Petri dishes must be sterilised before use • culture media must be sterilised before use • inoculating loops used to transfer microorganisms to the media must be sterilised by passing them through a flame • the lid of the Petri dish should be secured with adhesive tape and the Petri dish stored upside down • cultures should generally be incubated at 25 °C			
11.4	Any **two** from: • repeat the experiment several times • trial different disinfectants • swab teats before treatment so it is possible to see if treatment kills any bacteria		2	AO3/3a 4.1.1.6
TOTAL			**11**	

Paper 2

Question 01

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
01.1	nucleus		1	AO1/1 4.1.1.1
01.2	nucleotides		1	AO1/1 4.6.1.5
01.3	homozygous recessive		1	AO1/1 4.6.1.6
01.4	cc		1	AO2/2 4.6.1.6
01.5	0.25		1	AO2/2 4.6.1.6
TOTAL			**5**	

Question 02

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
02.1	Producer		1	AO1/1 4.7.4.1
02.2	Community		1	AO1/1 4.7.1.1
02.3	photosynthesis		1	AO1/1 4.7.2.1
02.4	0.32		1	AO2/2 4.7.4.3
02.5	Any **two** from the following: • not all of the hedgehog is eaten • some is lost as faeces • some is lost in urine • large amounts (of glucose) is used in respiration	allow examples, e.g. bones	2	AO1/1 4.7.4.3
02.6	Any **two** suitable differences with explanation: • less cabbage biomass as less light so less photosynthesis • fewer hedgehogs as they hibernate in winter • fewer snails as too cold for them to move about	look for differences with an explanation which would show that a pyramid of biomass is different at different time of year	2	AO2/1 4.7.4.2
TOTAL			**8**	

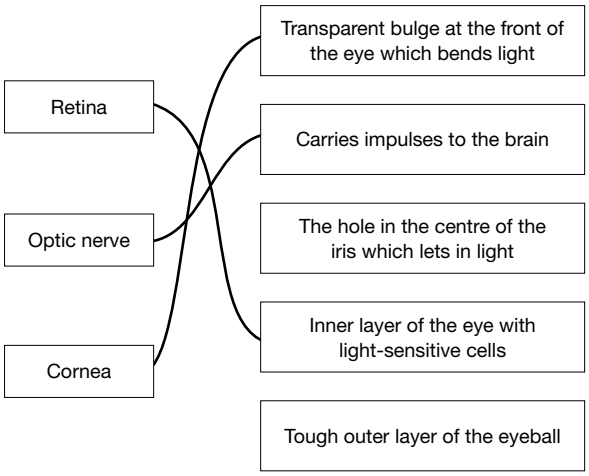
Question 03

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
03.1	all the organisms of the same species in a one place		1	AO1/1 4.7.1.1
03.2	place quadrats at random count the number of thistles in quadrat repeat several times calculate mean number of thistles per quadrat and multiply by area of the field	not 'throw quadrat' accept description of placing repeat needs to be at least ten times if a number is given	1 1 1 1	AO1/1 4.7.2.1
03.3	$\frac{30 \times 63}{6} = 315$		1	AO2/2 4.7.2.1
03.4	would lead to an overestimate if snails with paint are predated then fewer will be recaptured		1 1	AO2/2 4.7.2.1
TOTAL			**8**	

Question 04

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
04.1	so enzymes can work at optimum temperature		1	AO1/1 4.5.1
04.2	Sweat glands: increase production of sweat which evaporates and cools body Blood vessels: dilate (vasodilation) and allow blood to flow near surface of skin and heat is lost by radiation	look for an explanation of how heat is lost	1 1	AO1/1 4.5.2.4
04.3	muscles contracting requires energy from respiration respiration releases heat energy which raises body temperature		1 1	AO1/1 4.5.2.4
TOTAL			**5**	

Question 05

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
05.1			3	AO1/1 4.5.2.3
05.2	contract slack thicker		1 1 1	AO1/1 4.5.2.3
05.3	less light enters the eye light cannot damage the back of the eye	 accept retina or nerve endings	1 1	AO2/2 4.5.2.3
TOTAL			**8**	

Question 06

06.1	A: no auxin is made stems do not grow B: auxin moves to all parts of stem all parts of stem grow C: auxin accumulates on shaded side shaded side elongates and stem bends towards light		1 1 1 1 1 1	AO2/2 4.5.4.1
06.2	Gravity		1	AO1/1 4.5.4.1
TOTAL			**7**	

Question 07

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
07.1	Brain and spinal cord		1	AO1/1 4.5.2.1
07.2	Receptors		1	AO1/1 4.5.2.1
07.3	Cerebellum		1	AO1/1 4.5.2.2
07.4	Stimulus: pain (from pin prick) Effector: muscle (in the arm which moves hand away)		1 1	AO1/1 4.5.2.1
06.4	**Level 3:** A detailed and coherent explanation is provided of how each neurone is involved in the reflex and how response is enabled. Order of events is important for this level.		3–4	AO1/1 AO2/1 4.5.2.1
	Level 2: Simple statements made, but not precisely and links not clear.		1–2	
	No relevant content.		0	
	Indicative content • receptor in fingertip detects pain • impulse is sent to spinal cord • via the sensory neurone • impulse passes to relay neurone • relay neurone is in spinal cord • impulse is passed to motor neurone • impulse passes down motor neurone to muscle in the arm • muscle contracts • finger is moved away from pin/ pain			
TOTAL			**9**	

Question 08

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
08.1	Alfred Wallace		1	AO1/1 4.6.3.2
08.2	(Jean-Baptiste) Lamarck		1	AO1/1 4.6.3.1
08.3	Soft-bodied animals		1	AO1/1 4.6.3.5
08.4	Passing of genes to offspring by organisms most suited to their environment		1	AO1/1 4.6.3.4
08.5	mutation		1	AO1/1 4.6.2.1
08.6	5.4		1	AO2/2 4.6.3.4
08.7	2		1	AO2/2 4.6.3.4
08.8	**Level 3:** A detailed and coherent explanation is provided of how natural selection affects the numbers of one colour of moth over another.		3–4	AO2/2 4.6.1.3 4.6.3.1
	Level 2: Simple statements made, but not precisely and links not clear.		1–2	
	No relevant content.		0	
	Indicative content • there is variation in colour in the population of moths in the city • birds feed on the moths • those moths which are more easily seen will get eaten • those moths which are camouflaged don't get eaten and survive • moths which survive pass on their alleles to their offspring • in city moths with allele for dark colour survive better • may be more pollution in cities even after clean air act so trees are darker			
TOTAL			**11**	

Question 09

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
09.1	FSH – Causes maturation of an egg in the ovary Testosterone – Stimulates sperm production in the testes Oestrogen – Produced in the ovary	Do not award a mark if a line is drawn to more than one description.	1 1 1	AO1/1 4.5.3.4
09.2	Condom		1	AO1/1 4.5.3.5
09.3	FSH: will stimulates the eggs to mature in the ovaries LH: causes ovulation		1 1	AO1/1 4.5.3.4
09.4	In favour: • allows woman to have a baby of her own • baby has DNA from both parents Against: • IVF treatment is emotionally and physically stressful • the success rates are not high • it can lead to multiple births	To gain full marks the student must have at least one point in favour and at least one point against.	3	AO3/1b 4.5.3.6
TOTAL			**9**	

Question 10

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
10.1	Kingdom tigris	ignore italics or underlining	1 1	AO1/1 4.6.4
10.2	weight / mass of animals available for the tiger to eat		1	AO2/1 4.7.2.1
10.3	20		1	AO2/1 4.7.1.1
10.4	**Level 2:** A detailed and coherent explanation is provided. Logical links between clearly identified, relevant points explain how the population of tigers is affected by deforestation.		3–4	AO1/1 4.7.1.1 4.7.3.1 AO2/2 4.7.1.3
	Level 1: Simple statements made, but not precisely. The logic is unclear.		1–2	
	No relevant content.		0	
	Indicative content • loss of habitat for tigers • loss of habitat for prey animals • loss of food sources for prey animals • so fewer prey animals • increased competition between tigers and/or other predators for prey • as less prey fewer tigers in the forest • increased competition between tigers for mates as fewer tigers			
TOTAL			**8**	

Question 11

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
11.1	avoids the cost of keeping a bull allows farmer to choose which bull he gets sperm from / characteristics of bull he gets sperm from		1 1	AO3/2a 4.6.2.3
11.2	lot of muscle tissue fast growing	accept suitable suggestions related to beef cattle	1 1	AO3/2a 4.6.2.3
11.3	**Level 3:** A detailed and coherent evaluation is given, which considers the advantages and disadvantages of using embryo transplantation to farmers who want to improve their herds.		5–6	AO3/1b 4.6.2.5 4.6.2.3
	Level 2: A discussion of advantages and disadvantages of embryo transplantation, with attempts at relevant explanation, but linking is not clear.		3–4	
	Level 1: Simple statements are made, but no attempt to link to explanations.		1–2	
	No relevant content.		0	
	Indicative content Advantages: • can choose characteristics in bull and cow • avoids cost of buying high value bull and cows • surrogate cows do not need to be high quality • can transplant embryos on same day so calves will be born around same time • can breed from the offspring with desired characteristics Disadvantages: • requires vet to carry out transplantation • cost of embryos • need to keep detailed records of source of eggs and sperm • possibility of inbreeding if don't know parentage of calves			
TOTAL			**10**	

Question 12

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
12.1	oxygen is used in respiration more bacteria, more respiration		1 1	AO1/1 4.7.2.2 AO2/1 4.7.2.2
12.2	so oxygen could not enter the tube from the air		1	AO2/2 4.7.2.2
12.3	blue		1	AO2/2 4.7.2.2
12.4	axis correct scale and labelled 5 points plotted correctly points joined with straight lines	allow 1 mark for 4 points correctly plotted	1 2 1	AO2/2 4.7.2.2
12.5	if not many bacteria at start it may never go white	look for more than just taking too long	1	AO3/2b 4.7.2.2
12.6	pH probe gives a numerical reading difficult to judge change in colour and pH probe avoids this		1 1	AO2/2 4.7.2.2
12.7	no bacteria present in the milk as it has been heat treated		1	AO3/2b 4.7.2.2
TOTAL			**12**	

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