

Topic test mark scheme

1. Mitosis

AQA SAM paper 1H q9

09.1	C		1	AO2/1 4.1.2.2
09.2	cytoplasm and cell membrane dividing	accept cytokinesis for 1 mark	1	AO2/1 4.1.2.2
	to form two identical daughter cells		1	AO2/1 4.1.2.2
09.3	stage 4		1	AO3/1a 4.1.2.2
	only one cell seen in this stage		1	AO2/2 4.1.2.2

21st century q12 sam

Question	Answer	Marks	AO element	Guidance
12 (a)	<p>FIRST CHECK THE ANSWER ON THE ANSWER LINE If the answer = 3.17 award 2 marks</p> <p>$(7 \div 221) \times 100 \checkmark$ 3.17 \checkmark</p>	2	1.2	
	or 3.2 rounded. Allow 3.1 from adding up			
(b)	<p>Cells are genetically identical / have the same DNA \checkmark</p> <p>So both (daughter) cells receive all of the genetic information / a full copy of the genetic material \checkmark</p>	2	1.1	<p>ALLOW in context of identical to each other or identical to parent ALLOW same genetic information / material</p> <p>ALLOW same / correct amount of DNA IGNORE 'new cells need genetic material' without ref to full amount</p>

Allow diploid for 2nd point

June 16 iGCSE Ib q11

(b)	1. produces four cells / has two cell divisions; 2. produces haploid cells; 3. halves the chromosome number; 4. produces <u>genetic</u> variation / cells not <u>genetically</u> identical / eq; 5. produces gametes / sex cells / involved in sexual reproduction / eq; 6. takes place in gonads / ovaries / testes / sex organs;	allow converse for mitosis 3. ignore 23 chromosomes	Max 4
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2. Percentile charts Edexcel b1 SAM q2

Question number	Answer	Acceptable answers	Mark
2(a)(i)	8 (lbs)	± 0.4 lbs	(1)

Question number	Answer	Mark
2(a)(ii)	Answers within the range of 2.0-2.4(lb)	(1)

Question number	Answer	Acceptable answers	Mark
2(a)(iii)	The difference in mass has increased as the child gets older	Accept: the difference in mass is now 5.0-5.5 lbs	(1)

AQA 2H SAM q5

5(a)	because stem cells can (be made) to differentiate		1
	into nerve / muscle cells		1
5(b)	ethical issues with destruction / damage to embryo		1

3. AQA ppt

grow from parents;

by vegetative reproduction/asexual reproduction;

no sexual reproduction

from meristem cell ;

(2 marks)

Question Number	Answer	Acceptable answers	Mark
3(c)	Any two from the following: <ul style="list-style-type: none"> sexual reproduction involves two parents but asexual reproduction only involves one (organism / parent / cell) (1) sexual reproduction needs gametes / sex cells but asexual reproduction does not (1) sexual reproduction produces genetically different organisms but asexual reproduction produces genetically identical offspring / clones (1) 	ignore any reference to meiosis or mitosis sexual reproduction results in variation but asexual reproduction does not	(2)

4. June 2106 iGCSE IB q7

Question number	Answer	Notes	Marks
7	1. identical; 2. explant; 3. sterile; 4. microorganisms / fungi / bacteria / microbes / viruses / pathogens; 5. growth / nutrient / culture; 6. carbohydrate / sugar / sucrose / glucose / starch; 7. chlorophyll / chloroplast; 8. <u>nitrate</u> ; 9. large(r) / great / high / many / more / mass / big / eq; 10. any / different;	2. ignore cutting 3. ignore clean 4. ignore disease / infection Allow agar	10

5. June 2013 iGCSE IB q13

1 cow with high milk yield / eq; 2 male/bull with high milk yield daughters or high milk yield mother / eq; 3 reproduce / mate / breed / AI / eq; 4 repeat process with high milk yield offspring / many generations / eq;	cows with high yield milk are allowed to reproduce = 2 use sperm from bull	Max 3
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(ii) bacillus thuringensis

(iii) b3 june 2016 Q6

Question number	Answer	Notes	Marks
6 (c)	<p>An explanation linking two of the following</p> <p>(Agrobacterium tumefaciens) infects the plant (cell)/is a vector (1)</p> <p>transfer of {plasmid/gene/DNA} to plant cell/incorporation of gene into plant DNA (1)</p> <p>growth of a {crown gall/tumour} (1)</p>	accept leaf discs for plant cells	(2)

6.

7(a)(i)	none / zero / 0 / 0mg;		1
(ii)	increase / eq;		1
(b)(i)	lots of cows / group / eq;	repeat not qualified = 0	1
(ii)	<ol style="list-style-type: none"> 1. species / breed / type of cow / eq; 2. age / mass / size; 3. food / grass / eq; 4. water; 5. (air) temperature; 	Ignore gender Ignore number in group Ignore conditions / environment	2 max
(c)(i)	<u>denatured</u> ;	Ignore broken down / stops working / active site changes shape Reject killed	1
(ii)	<ol style="list-style-type: none"> 1. <u>HCl</u> / <u>hydrochloric acid</u>; 2. enzyme / protease / pepsin; 3. breakdown / digest; 4. (acid) <u>denatures</u> growth hormone; 	Mp1 Ignore low pH / acid	3

(d)

Human growth hormone gene removed from chromosome/genome with enzyme

- restriction enzymes
- produces sticky ends
- plasmid removed from bacteria
- plasmid cut with same restriction enzymes
- complementary sticky ends
- plasmid and gene mixed
- ligase used to reform plasmids
- plasmid inserted back into bacteria
- GM bacteria grown in a fermenter

Level	0	No rewardable material
1	1-2	<ul style="list-style-type: none">• the response is a simple explanation about the insulin gene being inserted into the bacteria• many of the stages of the process will be missing, incorrect or non-sequential• may be reference to enzymes• the answer communicates ideas using simple language and uses limited scientific terminology• spelling, punctuation and grammar are used with limited accuracy
2	3-4	<ul style="list-style-type: none">• there is an explanation of some of the stages involved in the insertion of the human insulin gene into a bacterial plasmid• some of the stages will be missing or in an incorrect order• will correctly mention some of the uses of enzymes and sticky ends• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately• spelling, punctuation and grammar are used with some accuracy
3	5-6	<ul style="list-style-type: none">• there is a detailed explanation of most of the stages involved in producing bacteria which express the human insulin gene• most or all of the stages will be present and in the correct order• the process will include correct reference to the use of restriction enzymes, sticky ends and ligase• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately• spelling, punctuation and grammar are used with few errors

7. – any 6 from the following points:

1. Different temperatures/range of temps/specified temps;
 2. Use same species of bacteria/same bacteria/same mass of bacteria/same amount of bacteria/same number of bacteria;
 3. Measure insulin produced;
 4. Insulin – mass/concentration/volume;
 5. Repeats needed/3 repeats;
- 6&7 Any 2 validity points of: Give bacteria the same nutrients/food/oxygen/same length of time/type of fermenter/sterile conditions;