

Biology GCSE Revision

Topic 1

Cell Biology

- Cell Structure
- Cell Division
- Transport in Cells

Mark Scheme

BL2HP

Question 2

question	answers	extra information	mark
2(a)(i)	makes / produces / synthesises protein / enzyme		1
2(a)(ii)	plant cell has nucleus / vacuole / chloroplasts / chlorophyll or plant cell is <u>much</u> larger	'It' = plant cell allow correct reference to DNA or chromosomes allow plant cell has fewer ribosomes allow cellulose (cell wall)	1
2(b)(i)	200	correct answer with or without working gains 2 marks if answer incorrect, allow 1 mark for $\frac{2 \times 50,000}{500}$ or $\frac{100,000}{500}$ or 100	2
2(b)(ii)	bacterial cell is too small / bacterial cell about same size as a mitochondrion / 'no room'	ignore references to respiration	1
Total			5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4(a)	contract / shorten	ignore relax do not allow expand	1	AO1 2.1, 2.2.1b,c, 2.1.1e
	to churn / move / mix food	accept peristalsis / mechanical digestion ignore movement unqualified	1	
4(b)	400	acceptable range 390-410 allow 1 mark for answer in range of 39 to 41 allow 1 mark for answer in range of 3900 to 4100	2	AO2 2.2.1b,c
4(c)	to transfer energy for use	allow to release / give / supply / provide energy do not allow to 'make' / 'produce' / 'create' energy allow to make ATP ignore to store energy	1	AO1 2.1.1a, 2.6.1d
	by (aerobic) respiration or from glucose	do not allow anaerobic energy released for respiration = max 1 mark	1	
4(d)(i)	to make protein / enzyme	ignore 'antibody' or other named protein	1	AO1 2.1.1a
4(d)(ii)	too small / very small	allow light microscope does not have sufficient magnification / resolution allow ribosomes are smaller than mitochondria ignore not sensitive enough ignore ribosomes are transparent	1	AO2 2.1.1a
Total			8	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)(i)	surface of organ(s)	allow covering / lining organ allow named example of an organ, e.g. surface of stomach allow the skin	1	AO1 2.2.1b/c
1(a)(ii)	A (cell) membrane B cytoplasm	allow phonetic spelling allow cell surface membrane do not allow (cell) wall	1 1	AO1 2.1.1a
1(b)	Protein synthesis		1	AO1 2.1.1a
1(c)	movement of <u>particles</u> / <u>molecules</u> from high to low concentration / down a concentration gradient	allow movement of ions / atoms ignore carbon dioxide or other named substance ignore along / across gradient ignore through membrane	1 1	AO1 2.1 2.1.2a/b
Total			6	

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Question 3

question	answers	extra information	mark
3(a)(i)	mitochondrion / mitochondria	must be phonetically correct	1
3(a)(ii)	carbon dioxide / CO ₂	in either order	1
	water / H ₂ O	accept CO ₂ but not CO ² accept H ₂ O or HOH but not H ² O	1
3(a)(iii)	diffusion		1
	high to low concentration	allow down a concentration gradient	1
	through (cell) membrane or through cytoplasm	do not accept cell wall	1
3(b)	ribosomes make proteins / enzymes		1
	using amino acids		1
	part A / mitochondria provide the energy for the process	allow ATP do not accept produce or make energy	1
Total			9

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Question 6

question	answers	extra information	mark
6(a)	water enters (funnel / sugar solution) or water diffuses in (to the funnel)	do not accept if diffusion of sugar	1
	membrane partially / selectively / semi permeable or by osmosis	allow description	1
	because concentration (of sugar) greater inside funnel than outside / water / in beaker	assume 'concentration' refers to sugar unless candidate indicates otherwise the position of the solutions may be implied	1
6(b)	(level / it) rises more slowly or levels out earlier or does not rise as much	accept inference of less steep gradient (of graph) allow less / slower osmosis / diffusion / less water passes through or less water enters funnel allow water enters / passes through slower	1
	less difference in concentration (between solution / funnel and water / beaker)	accept due to lower diffusion / concentration gradient / described	1
Total			5

Question 1

question	answers	extra information	mark
1(a)	xylem and phloem	either order allow words ringed in box allow mis-spelling if unambiguous	1
1(b)(i)	movement / spreading out of particles / molecules / ions / atoms	ignore names of substances / 'gases'	1
	from high to low concentration	accept down concentration gradient ignore 'along' / 'across' gradient ignore 'with' gradient	1
1(b)(ii)	oxygen / water (vapour)	allow O ₂ /O ₂ ignore O ² /O allow H ₂ O/H ₂ O ignore H ² O	1
Total			4

Question	Answers	Extra information	Mark	AO / spec ref.
2			6	AO1 2.1.2a,b, c, 2.2.1d, 2.3.1a,b, c,g, 2.6.1
Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5 and apply a 'best-fit' approach to the marking.				
0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)	
No relevant content.	An example is given of a named substance or a process or there is an idea of why diffusion is important eg definition.	At least one example of a substance is given and correctly linked to a process in either animals or plants.	There is a description of a process occurring in either animals or plants that is correctly linked to a substance and a process occurring in the other type of organism that is correctly linked to a substance.	
examples of points made in the response Importance of diffusion: <ul style="list-style-type: none"> to take in substances for use in cell processes products from cell processes removed Examples of processes and substances: <ul style="list-style-type: none"> for gas exchange / respiration: O₂ in / CO₂ out for gas exchange / photosynthesis: CO₂ in / O₂ out food molecules absorbed: glucose, amino acids, etc water absorption in the large intestine water lost from leaves / transpiration water absorption by roots mineral ions absorbed by roots 		extra information Description of processes might include: <ul style="list-style-type: none"> movement of particles / molecules / ions through a partially permeable membrane (movement of substance) down a concentration gradient osmosis: turgor / support / stomatal movements		
Total			6	

Question 5

question	answers	extra information	mark
5(a)	oxygen / O ₂ or carbon dioxide / CO ₂	allow O2 do not accept O ² allow CO2 do not accept CO ²	1
5(b)	any four from: <ul style="list-style-type: none"> • because structure X / gills has threads / filaments or is thin or tadpole has longer tail • there is an increased surface area • there is a shorter diffusion pathway • therefore an <u>increase</u> in exchange • eyes (now visible in older tadpole) • so that food / danger etc can be seen 	ignore references to tail used for locomotion ignore reference to nostrils ignore food accept reference to a good blood supply accept increased water flow over gills / tail will increase diffusion of gases	4
Total			5

Question	Answers	Extra information	Mark	AO / spec ref.
3(a)	any three from: <ul style="list-style-type: none"> • (water through a) partially permeable • membrane • from dilute to (more) concentrated solution 	accept 'semi permeable' / selectively permeable allow 'from a high concentration of water to a lower concentration (of water)' allow 'from high water potential to low water potential' allow 'down a concentration gradient of water' do not accept 'along a concentration gradient of water' allow requires no energy	3	AO1 3.1.1b
3(b)	(there are) many <u>hairs</u> or thin <u>hairs</u> or <u>hairs</u> are one cell thick (which gives) large / increased surface area or short diffusion pathway (so there is) more diffusion / osmosis (of water into the root)	ignore absorption	1 1 1	AO1 / AO2 3.1.1h, 3.1.3b
Total			6	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)	<u>diffusion</u>	this order only	1	AO2 3.1.1a/g
	<u>active transport</u>		1	
1(b)(i)	concentration (of sugar) in the bag was higher (than in the drink)	allow concentration (of sugar) in the drink was lower (than in the bag)	1	AO2 3.1.1.a/b/c
	or			
	higher concentration of <u>water</u> outside the bag or in the drink / boiling tube	allow higher <u>water</u> potential outside the bag or lower <u>water</u> potential inside the bag		
	(so) <u>water</u> moved in (to the tubing)	allow <u>water</u> moves down its concentration gradient	1	
	by osmosis	do not allow sugar moving allow diffusion (of water) do not allow sugar moving by osmosis or water moving by active transport	1	
1(b)(ii)	B		1	AO3 3.1.1a/b/c
1(b)(iii)	close(st) to the concentration in the bag or to 5%	allow small(est) diffusion gradient or close(st) to an equilibrium	1	AO2/3 3.1.1a/b/c
	(so rate of) diffusion / osmosis is slow	allow (so) less water moves in (to the bag)	1	
		ignore ref. to sugar		
Total			8	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)	sugar / glucose / carbohydrate	allow correctly named sugars	1	AO1 3.1.1d/e
6(b)(i)	3:1	do not allow 1:3 ignore 112:38 / 56:19 allow 2.95:1 allow 2.9:1	1	AO2 3.1.1e
6(b)(ii)	concentration is (slightly) lower than the blood or concentration is 20 units less (than blood) the ratio of sodium (ions) to potassium (ions) is close to 2:1	 allow has high levels of sugar / substance X to keep blood sugar levels stable or for (more) energy	1 1	AO3 3.1.1e
6(b)(iii)	cells shrivel / shrink (because) cells lose water due to osmosis (of water) or diffusion (of water)	ignore reference to flaccid / plasmolysed allow crenated allow because there is a higher concentration <u>of water</u> in cells (compared to the sports drink)	1 1 1	AO2/3 3.1.1b
Total			7	

5(c)(i)	any two from: <ul style="list-style-type: none"> • cells that are able to divide • undifferentiated cells / not specialised • can become other types of cells / tissues or become specialised / differentiated 	allow pluripotent	2	AO1 2.7.1k/l
5(c)(ii)	4-day embryo is a (potential) human life or destroying/damaging (potential) human life	allow cord would have been discarded anyway ignore reference to miscarriage allow cannot give consent	1	AO3 2.7
5(c)(iii)	perfect tissue match or hard to find suitable donors	allow same/matching antigens allow no danger of rejection allow no need to take immunosuppressant drugs (for life) ignore genetically identical or same DNA	1	AO2 2.7.1c
5(c)(iv)	stem cells have same faulty gene / allele / DNA / chromosomes	allow genetically identical ignore cells have the same genetic disorder	1	AO2 2.7.1c
Total			10	

Question 8

question	answers	extra information	mark
8	<p>any four from:</p> <p><u>embryo stem cells – examples of pros</u></p> <ul style="list-style-type: none"> • can treat a wide variety / lots of diseases / problems • many available / plentiful • using them better than wasting them • painless <p>cons</p> <ul style="list-style-type: none"> • (possible) harm / death to embryo • (relatively) untested / unreliable / may not work • embryo can't be 'asked' / 'embryo rights' idea <p><u>adult bone marrow stem cells – examples of pros</u></p> <ul style="list-style-type: none"> • no ethical issues (in collection) or permission given • quick recovery • (relatively) safe • well tried / tested / know they work 	<p>Marks should not be awarded for simply copying the information provided</p> <p>A mark may be awarded for a <u>comparison</u> between treatments if the answer only involves copied information</p> <p>For all 4 marks to be awarded, there must be at least 1 pro and 1 con</p> <p>allow long term effects not known or may be more risky</p> <p>allow does not kill (donor) / low risk</p>	4

	<p>cons</p> <ul style="list-style-type: none"> • operation hazards eg infection • few types of cell / tissue produced or few diseases / problems treated • painful so may deter donors <p>Conclusion to evaluation:</p> <p>A reasoned conclusion from the evidence</p>		1
Total			5

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Question 3

question	answers	extra information	mark
3(a)	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5, and apply a 'best-fit' approach to the marking.		6
0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)
No relevant content.	There is a brief description of at least one of the stages (pre-inoculation, inoculation, post-inoculation).	There is a simple description of at least two stages and an explanation of at least one of them.	There is a clear description of all three stages and an explanation of at least two of them.
<p>examples of biology points made in the response:</p> <p>Pre-inoculation</p> <ul style="list-style-type: none"> • Petri dish and agar sterilised before use • to kill unwanted bacteria • inoculating loop passed through flame / sterile swab • to sterilise / kill (other) bacteria <p>Inoculation</p> <ul style="list-style-type: none"> • loop/swab used to spread/streak bacterium onto agar <p><i>allow other correct methods, eg bacterial lawns</i></p> <ul style="list-style-type: none"> • lid of Petri dish opened as little as possible • to prevent microbes from air entering <p>Post-inoculation</p> <ul style="list-style-type: none"> • sealed with tape • to prevent microbes from air entering • incubate • to allow growth of bacteria 			

Question 3 continues on the next page

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Question 3 continued

question	answers	extra information	mark
3(b)(i)	bacteria killed / destroyed	ignore fights / attacks / stops growth / got rid of	1
3(b)(ii)	<i>Might be correct</i> largest area / space where no bacteria are growing	allow most bacteria killed	1
	<i>Might not be correct</i> (need more evidence as) D may be harmful to people / animals / surfaces or may work differently with different bacteria or disinfectants may be different concentrations	ignore ref to cost / dangerous or harmful unqualified	1
	or may not last as long	ignore different amounts of disinfectant unless reference to different drop size ignore take longer to work allow reference to anomalous result or not repeated	
Total			9