OXFORD

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INTERNATIONAL GCSE

BIOLOGY

9201/1

Paper 1

Mark scheme

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Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from oxfordaqaexams.org.uk

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can 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 descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

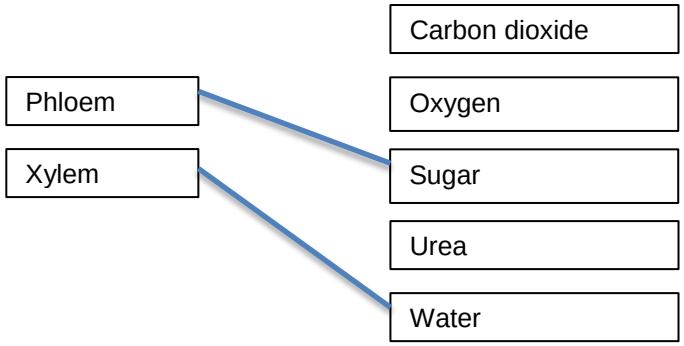
Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

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

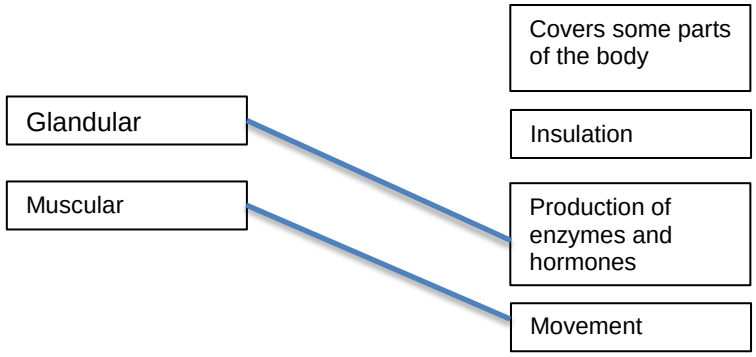
Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
01.1	A: palisade (mesophyll) B: guard cell		1 1	AO1 3.1.4a	G
01.2	glucose oxygen	can be in any order	1 1	AO1 3.2.1a	G
01.3	 if more than one line drawn from a tissue award no mark for that tissue		2	AO1 3.2.2f	G
01.4	asexual		1	AO2 3.5.1a	A
01.5	tissue culture	allow micropropagation ignore cloning	1	AO1 3.5.5a	

01.6	advantage any **one** from • quicker • grow many plants at once • same quality of fruit produced each time disadvantage any **one** from • all susceptible to same diseases • requires specialist equipment or technical skills • no (genetic) variation	 do **not** allow cheaper allow description allow description ignore cost	1 1	AO2 3.5.5a	

Total			**10**

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
02.1	sun	allow sunlight allow light	1	AO1 3.3.1a	
02.2		If more than one box ticked then no mark.	1	AO3 3.3.1c	A
02.3	As waste from the chicken. As wheat which is not eaten.	 If more than two boxes ticked, deduct one mark for each incorrect tick.	1 1	AO2 3.3.1b	A
02.4	13 930 (kg)		1	AO2 3.3.1b	G
02.5	any **two** from: • (can) control temperature • (can) control movement • less energy transferred (keeping warm or during movement) • to keep safe (from predators) • less / saves space (so more chickens in same area)	allow keep warm allow less energy / biomass is lost ignore cost	2	AO2 3.3.1	
02.6	any **one** from • more infection ***or*** increased spread of infection • chickens have less space to move around ***or*** more stress for chickens.	ignore ref to not natural ignore unethical unqualified allow cruelty	1	AO3 3.3.1	

Total			8

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
03.1	A: cell membrane B: nucleus	do **not** allow cell wall	1 1	AO1 3.1.1a	G
03.2	 if more than one line drawn from a function no mark should be awarded for that function.		2	AO1 3.1.3a/b	G
03.3	to pump blood (around the body)	Ignore references to oxygen	1	AO2 3.2.3d/i	
03.4	right atrium	if more than one box ticked then no mark	1	AO1 3.2.3d	A
03.5	(cell which) can differentiate into all other kinds of cells	allow unspecialised / undifferentiated cell allow can divide by mitosis to produce more stem cells	1 1	AO2 3.5.2j/k	
03.6	any **one** from: • (adult) bone marrow • embryo(s)	allow other correct answers e.g. umbilical cord, amniotic fluid.	1	AO1 3.5.2k	
03.7	any **two** from: • no/less chance of rejection • no need to take immunosuppressant drugs • no need to tissue match • no need to wait for transplant/donor	allow ideas of relative surgical risk allow same tissue type / tissue antigens ignore same blood group do **not** accept donor heart may be faulty / infected	2	AO2 3.2.3s 3.5.2k/l	

03.8	(may develop) cancer / tumours	allow uncontrolled cell division	1	AO2 3.5.2n	

Total			**12**

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
04.1	A: oesophagus B: duodenum	ignore gullet	1 1	AO1 3.2.4a	
04.2	protease (enzymes) in the stomach / small intestine breakdown proteins into amino acids (so amino acids) diffuse into blood stream **or** (amino acids) are absorbed through the microvilli in the small intestine	allow pepsin (in stomach) allow trypsin (in small intestine) allow (amino acids) are actively absorbed	1 1 1 1	AO1 3.2.4c	
04.3	appropriate straight line of best fit.		1	AO2 3.5.2n 6.1	
04.4	overall increase in risk with more meat **or** data in support of this ref to 'outliers' or examples eg fewer cases with 80g than with 40g other/named factors not considered	allow used data ignore reference to anomalies	1 1 1	AO3 3.5.2n	
04.5	any **two** from: (from cancerous tissue) • colon cancer cells are randomly arranged • cells are irregularly shaped • increased number of cells • loss of space / gaps • thicker cell membrane • cancerous cells have spread to other areas / to inside the colon	allow converse for healthy tissue allow cell lose order allow thicker layer of cells do **not** accept thicker cell wall	2	AO2 3.5.2n	

04.6	copies of genetic material / chromosomes are made two (genetically) identical cells are formed **or** two cells which are (genetically) identical to the parent cell		1 1	AO1 3.5.2e	
04.7	0.25	an answer of 0.25 scores 2 marks ignore $\frac{1}{4}$ allow $\frac{2}{8}$ for 1 mark	2	AO2 3.5.2e	

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
04.8	**Level 2:** Some logically linked reasons are given. There may also be a simple judgement.		3-4	AO3 3.5.2n	E
	Level 1: Relevant points are made. They are not logically linked.		1-2	AO3 3.5.2n	E
	No relevant content		0		E
	• Both X and Y killed tumour cells. • overall, very little difference in effectiveness between X and Y • figures to support eg mean death rate with X = 53.8%, with Y = 53.0% • (but) X caused higher death rates than Y in 3 out of 4 samples • use of drugs together increased effectiveness • figures to support eg: o mean death rate with X and Y combined = 65% o drug X and Y together are 26% better than X alone and 14% better than Y alone – 50% increase in cell death for X and 22% increase in cell death for Y. • no treatment killed all cells • variation between samples may be due to different types of colon cancer cells • need to test drugs on many more samples of cells to reach more definite conclusions Ignore comparisons between cell samples. For a level 2 answer calculations must be included.				

Total			20

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
05.1	$\frac{49-17}{17}$ x 100 188.235	an answer of 188.235/188 scores 2 marks	1 1	AO2 6.3.4 6.3.11 3.2.6g	
05.2	so comparisons can be made as the groups have different breathing rates at the start.		1 1	AO4 3.2.6g	
05.3	any **one** from • gender • distance • type of exercise	allow all men allow all swam 100 m allow all swam as fast as possible	1	AO4 6.1	
05.4	any **one** from: • (percentage) increase in heart rate • how fast they completed the 100 m • resting heart rate	allow recovery rate of breathing/heart rate to return to normal ignore heart rate unqualified allow VO_2 max	1	AO4 6.1	
05.5	increase in heart rate or depth of breathing (so) increase in rate of delivery of O_2 to muscles (so) more O_2 and glucose for respiration (in muscles) glycogen converted to glucose (in muscles) **or** if oxygen in short supply anaerobic respiration happens **or** if anaerobic respiration happens lactic acid build up		1 1 1 1	AO1 3.2.6g	

05.6	$S = \frac{(193-186)}{\sqrt{2}}$ S = 4.95	An answer of 4.95(49) or correct rounding scores 2 marks allow correct rounding of 4.9549..	1 1	AO2 6.3.3	
05.7	as S value is **lower** than 12.71 **so not** significant difference	allow ecf from student's calculation of S	1	AO4 6.3.12	

Total			**13**

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
06.1	(section of) DNA / chromosome that codes for (a) protein	ignore characteristics	1	AO1 3.5.3i	
06.2	different amino acid is coded for (so) sequence of amino acids altered (so) shape of protein altered.		1 1 1	AO1 AO2 3.5.3k	
06.3	1- 0.45 = 0.55 active at 40% 1- 0.80 = 0.20 active at 80% $\frac{0.35}{0.55}$ x 100 63.6 (%)	correct answer of 63.6(3636) gains 3 marks. allow correct substitution of incorrect value allow correct rounding of 63.6363…. students who calculate the percentage decrease that **do not work** can be awarded 1 mark if calculation correct (77.78)	1 1 1	AO2 3.5.3k 6.3.3	
06.4	increased amount of changed AB protein in memory area (so) fewer synapses work (and) death of connecting nerve cells (so) memory area becomes less active		1 1 1 1	AO3 3.5.3k 3.4.1d	
06.5	to see if there are any changes in the DNA (code)	accept ‘mutation’ for ‘changes in DNA code’	1	AO2 3.5.3k	

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
06.6	advantage any **one** from • might be treatment available that can slow down the onset • may choose not to have children • can plan ahead or can find support (in advance of onset) disadvantage any **one** from • worry for other family members who may not have been screened. • worry for other family members about symptoms developing (in screened person)	ignore to find out if you have it or not allow other sensible suggestions	1 1	AO3 3.5.4a	

Total			**14**

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
07.1	sewage stimulates growth of algae / plants at surface (of lake) (so) plants (below surface) receive insufficient light for photosynthesis and die microorganisms feed on dead plants and reproduce microorganisms respire and remove O_2 (from water) (so) less O_2 available for other aerobic organisms which die (reducing biodiversity of lake)	allow sewage contains ion/ nitrates / nutrients ignore references to sewage / toxins killing organisms	1 1 1 1 1	AO1 3.3.4b	
07.2	to stop bacterial / algal / plankton action (which will change nitrate concentration)	allow to prevent evaporation	1	AO4 3.3.3b/c	
07.3	any **two** from • dissolved oxygen fall from Jan to Aug when it is at a minimum of 12 and then (rapidly) rises to its maximum of 45 in Nov - Dec. • nitrate ion concentration rises from (47 in) Jan – Feb to a maximum of 54 from April through to August and then falls to its lowest of 28 in Nov – Dec. • water temperature rises from a minimum of 18°C in Jan – Feb to a maximum of 31°C in July – Aug before falling in Nov – Dec (to 20°C)	accept + or – 1 if no other marks awarded allow 1 mark for two described trends with no reference to data	2	AO2 3.3.4b	

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
07.4	0.088g	Answer of 176 scores 3 marks	1	AO2 3.3.4a/b	
	$\frac{0.088}{0.5}$ = 0.176 g/dm^3	allow 146.076 – 145.988	1		
	176 mg/ dm^3		1		
07.5	high(er) temperatures / light intensity / nitrate ions so algae / plants grow quickly and (then) die		1	AO3 3.2.1c 3.3.3b	
	(then) microorganisms feed on dead algae / plants and deplete oxygen levels		1		
		if no other marks awarded allow 1 mark for: • the warmer water is the less dissolved oxygen it can hold • eutrophication is fastest			

Total			**13**