OXFORD
INTERNATIONAL
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INTERNATIONAL GCSE
Biology
9201/1

Paper 1

Mark Scheme

November 2020

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20BY92011/MS

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 aqa.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.
01.1	behaviour an animal is born with		1	AO1 3.4.6c
01.2	a bird follows the first moving object it sees after hatching		1	AO1 3.4.6c
01.3	increased chance of offspring surviving		1	AO1 3.4.6b
01.4	to reinforce the behaviour	allow described as a reward to encourage the dog the find cloth again	1	AO3 3.4.6d
01.5	C highest number of (smell) receptors easiest / easy to train	 if use of numbers they must be comparative 	1 1 1	AO3 AO2 3.4.6d
01.6	 $\frac{348}{2366} \ x \ 100$ 14.7	an answer of 14.7 / 15 scores 2 marks allow correct rounding of 14.708…..	 1 1	AO2 3.4.6d 6.3.3
01.7	training police horses	allow other correctly described example	1	AO1 3.4.6d
Total			**10**	

<table>
<tr><th>Question</th><th>Answers</th><th>Extra information</th><th>Mark</th><th>AO / Spec. Ref.</th></tr>
<tr><td>02.1</td><td>gene</td><td></td><td>1</td><td>AO1
3.5.3c</td></tr>
<tr><td>02.2</td><td>cell membrane

cytoplasm</td><td></td><td>1

1</td><td>AO1
3.1.1a</td></tr>
<tr><td>02.3</td><td>23</td><td></td><td>1</td><td>AO1
3.5.3d</td></tr>
<tr><td>02.4</td><td><table><tr><th>Statement about mitosis</th><th>True</th><th>False</th></tr><tr><td>Produces cells for growth</td><td>✓</td><td></td></tr><tr><td>Produces gametes</td><td></td><td>✓</td></tr><tr><td>Produces replacement cells</td><td>✓</td><td></td></tr></table>all correct for 2 marks
2 correct for 1 mark</td><td></td><td>2</td><td>AO1
3.5.2d
3.5.2g</td></tr>
<tr><td>02.5</td><td>8 chromosomes drawn in B

4 chromosomes in C and D

2 long (white) and 2 short (black) in C and D</td><td></td><td>1

1

1</td><td>AO2
3.5.2e</td></tr>
<tr><td>02.6</td><td>any one from:
• results in 4 cells
• halves chromosome number (in each cell produced)
• two cell divisions</td><td>

allow cells produced have two chromosomes
allow haploid

allow cells produced will not be <u>genetically</u> identical</td><td>1</td><td>AO2
3.5.2h
3.5.2g</td></tr>
<tr><td>Total</td><td></td><td></td><td>10</td><td></td></tr>
</table>

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	movement of particles from (an area of) high(er) concentration to (an area of) low(er) concentration **or** down a concentration gradient'	allow molecules / ions ignore along / across a concentration gradient'	1 1	AO1 3.1.5a
03.2	4.8×10^5 : 1	allow 480 000 : 1	1	AO2 3.1.5h 6.3.6 6.3.15
03.3	any **one** from: • carbon dioxide • glucose • ions • amino acids • water	allow named ions such as nitrate, sodium	1	AO1 3.1.5b 3.2.2a

03.4	a large surface area as many alveoli **OR** good ventilation (1) to maintain the concentration gradient (1) **OR** thin surface (1) **or** blood capillaries surrounding each alveolus are only one cell thick so short diffusion pathway (1) **OR** efficient blood supply (1) **or** lots of capillaries to maintain the concentration gradient (1)	allow description in terms of intercostal and diaphragm muscle contraction. allow surface is one cell thick do **not** accept alveolus is one cell thick.	1 1	AO1 3.1.5i 3.2.5c

03.5	**Level 3:** The design/plan would lead to the production of a valid outcome. All key steps are identified and logically sequenced.	5-6	AO4 3.1.5
	Level 2: The design/plan would not necessarily lead to a valid outcome. Most steps are identified, but the plan is not fully logically sequenced.	3-4	
	Level 1: The design/plan would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.	1-2	
	No relevant content	0	
	Indicative content **Control Variables** • cut agar block to the same size (using the ruler and scalpel) • cut all agar jelly blocks from one source **or** use the same concentration of pink colour in all agar jelly blocks • measure the same volume of acid (with the measuring cylinder) • use the same temperature of acid **Method** • use a range of different concentrations of acid (minimum 3) • place acid in beaker and agar blocks into the acid • measure of how long it takes for agar block to turn from pink to colourless **or** cut the blocks after a certain period of time and then measuring the depth of the colourless section • repeat at each concentration (minimum of three times) • calculate a mean for each acid concentration For level 3 control variables and a means of determining the results must be included.		

Total			**12**

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	any **two** from: • less competition for light • less competition for space • less competition for water • less competition for nutrients (in soil) • colonisation of new areas	allow descriptions of less competition If no other marks awarded allow 1 mark for 'less competition'	2	AO2 3.3.2b
04.2	spikes / prickles / hairs any **one** from: • deter / stop animals from eating it • protects the seed from damage • catch on animal fur for dispersal		1 1	AO2 AO3 3.3.2f
04.3	(True value =) 75 (mm)		1	AO2 3.3.2f 6.4
04.4	2 (mm)	allow ecf from question **04.3**	1	AO4 3.3.2f 6.4

04.5	r = 31 $\frac{4}{3}$ x 3.14 x 31^3 124 724.987 (mm^3) 1.25 x 10^5 (mm^3)	an answer of 1.25 x 10^5 (mm^3) scores 4 marks allow any correct rounding of 1.25 x 10^5 (mm^3) scores 4 marks allow incorrect value for r correctly substituted allow any correct rounding of 124 724.987…. allow 1.2 x 10^5 (mm^3) allow any correct rounding of 1.25 x 10^5 (mm^3) allow 1 mark for correct standard form from incorrect calculation using numbers given in the question	1 1 1 1	AO2 3.3.2f 6.3.10 6.3.3 6.3.15

Total			**10**

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	10 (%)	do **not** accept 10 000 / 1000 = 10 (%)	1	AO2 3.3.1b
05.2	any **two** from: • some of the biomass from the insect is lost as waste materials • some used in respiration (in the insect) • (some of the insect) is not eaten	allow named waste material / excretions allow not digested	2	AO2 3.3.1b
05.3	microorganisms break down / decompose / digest (carbon compounds in dead birds) (microorganisms) respire (microorganism respire and) release CO_2 CO_2 used in photosynthesis (to make glucose / carbon compounds)	allow bacteria / fungi / decomposers / microbes ignore ingest	1 1 1 1 1	AO1 3.3.3e
Total			**8**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	receptor	ignore pain / temperature / pressure allow nerve endings	1	AO1 3.4.2c
06.2	any **four** from: • impulse (from receptor) through sensory neurone • transmission across synapse • (crosses synapse) as a chemical • (via sensory) relay and motor neurone • muscle contracts (to withdraw finger)	ignore stimulus detected by receptor ignore reference to brain must be in correct order	4	AO1 3.4.1d
06.3	210 **and** 88 (210 – 88) = 122	an answer of 122 scores 2 marks allow one mark for correct calculation with **one** incorrect value read from graph (must be clear that it is total time – pain threshold.)	1 1	AO2 3.4.1 6.3.11
06.4	possible damage to cells / tissues / hand	allow damage to skin allow might get frostbite	1	AO4 3.4.1

06.5	D (at 240 seconds) no pain has been felt **or** (at 240 seconds) they never reached a pain threshold.		1 1	AO3 3.4.1

06.6	correct parental genotypes **or** gametes: **Aa** and **Aa** **or** **A** and **a** and **A** and **a**	allow alternative symbols **only** if defined	1	AO2 AO3 3.5.3g 6.3.6
	offspring genotypes correctly derived**:** **AA Aa Aa aa**	allow (offspring) genotypes correct for student's parental genotypes / gametes	1	
	identification of **aa** as having syndrome **X**		1	
	correct probability: 0.25 / $^1/_4$ / 1 in 4 / 25% / 1:3	do **not** accept 3:1 / 1:4	1	

Total			**14**

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	homeostasis		1	AO1 3.4.2
07.2	(pancreas) releases insulin		1	AO1 3.4.5a,b
	(so more) glucose moves from blood into cells		1	
	(where) glucose is stored as glycogen	allow glucose is converted to glycogen allow excess glucose stored as lipid	1	
	(glycogen stored or glucose moves in to) muscle / liver (cells)		1	
07.3	any **three** from: • blood glucose concentration higher overall **or** blood glucose concentration reaches a higher peak • blood glucose concentration increase is greater / faster / steeper • blood glucose concentration remain higher for longer / drop later (after glucose drink) • decrease is slower / more gradual **or** the concentration does not return to its starting level (within two hours)		3	AO2 3.4.5d
Total			**8**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	any **four** from: Structure (for arteries) • thick(er**)** muscle • thick(er) / elastic tissue **or** more elastic tissue / fibres • small(er) lumen • no valves whereas veins do have valves Function (for arteries) • carry blood at high(er) pressure • carry blood away from the heart whereas veins carry blood to the heart Function (for veins) • carries blood at low pressure so has valves to prevent backflow	max three marks for structure allow converse if clearly referring to veins. answers must be comparative if neither mark awarded allow 1 mark for thicker wall	4	AO1 AO2 3.2.3l,j

08.2	thicker (muscle in) left ventricle wall (so) reduced volume / size inside the left ventricle (so) less oxygenated blood leaves heart (through the aorta) (and) less oxygen delivered to cells / tissues / muscles (so) less respiration (and energy release)	reference to oxygen needed only once do **not** accept create / produce energy allow more anaerobic respiration so increase in lactic acid	1 1 1 1 1	AO2 AO3 3.2.3b,c,h 3.2.6b

Total			**9**

Question	Answers	Extra information	Mark	AO / Spec. Ref.
09.1	the shape of the active site is changed (so) substrate / protein no longer fits / binds to the active site	 allow no enzyme – substrate complex formed. If no other marks awarded allow **1** mark for enzyme denatured	1 1	AO1 3.2.4b
09.2	does not dissolve / break down in acid pH of stomach (and cause an ulcer) does break down in alkaline pH of small intestine (to release the drug) (thick coating so) breaks down slowly over time	allow pH 1 – 6 for acid	1 1 1	AO2 AO3 3.2.4c
09.3	both drug **D** and **E** lower the mean number of swollen cells compared with no drug in all parts of the eye drug **D** lowers the mean number of swollen cells in eye parts **X** and **Y** <u>more /greater</u> than drug **E** **or** drug **E** has the lowest number of swollen cells in eye part **Z** <u>only</u> range of results for drugs **D** and **E** overlap in eye parts **X** and **Y** (so) differences may be due to errors / other factor range of results for drug **E** do not overlap for eye part **Z** (so) difference are less likely to be due to errors / other factors	allow both drug D and drug E are effective at treating swollen cells	1 1 1 1	AO3 3.4.7b 6.4
Total			**9**	