OXFORD

INTERNATIONAL
AQA EXAMINATIONS

INTERNATIONAL GCSE
Biology
9201/1

Paper 1

Mark Scheme

November 2021

Version: 0.1 Pre-Standardisation

21BY92011/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.

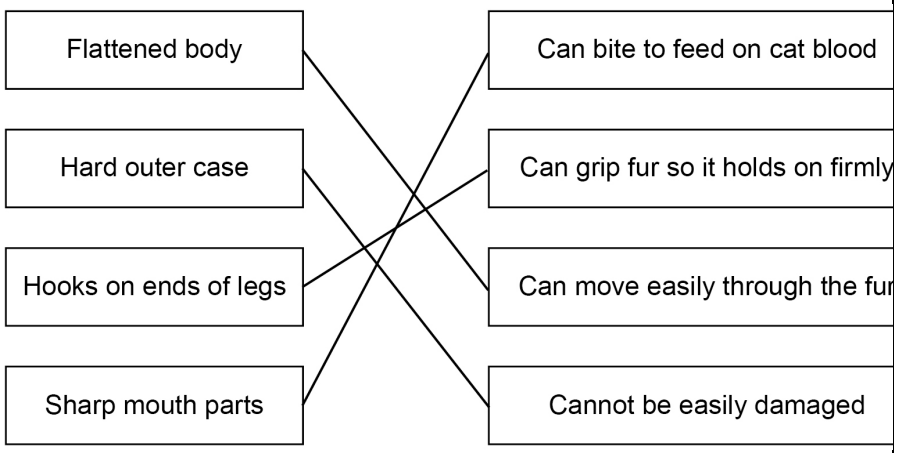
An answer which contains nothing of relevance to the question must be awarded no marks.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1.1	tongue eye ear	 allow retina allow cochlea	1 (1-3) 1 (1-3) 1 (1-3)	AO1 3.4.2c

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1.2	stimulus coordinator effector response	in this order only all correct = 3 marks 2 or 3 correct = 2 marks 1 correct = 1 mark	3 (1-3)	AO2 3.4.1d 3.4.1e

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1.3	as a chemical which moves across the gap / synapse / junction and causes an impulse (in the next neurone)	allow neurotransmitter / acetylcholine	1 (4-5) 1 (6-7)	AO1 3.4.1d

		Total	**8**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2.1	 all correct = 3 marks, 2 or 3 correct = 2 marks, 1 correct = 1 mark do not award mark if additional line drawn from one adaptation		3 (1-3)	AO2 3.3.2d

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2.2	structural		1 (1-3)	AO2 3.3.2f

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2.3	parasite host	in this order only	1 (1-3) 1 (4-5)	AO1 3.3.2f

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2.4	amino acid(s)		1 (6-7)	AO2 3.2.4c

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2.5	extremophile(s)		1 (4-5)	AO3 3.3.2e

		Total	**8**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3.1	plasma		1 (1-3)	AO1 3.2.3l 3.2.3m

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3.2	white blood cells		1 (1-3)	AO1 3.2.3l

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3.3	urea		1 (1-3)	AO1 3.2.3m

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3.4	carbon dioxide		1 (1-3)	AO1 3.2.3m

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3.5	to transport oxygen to the organs		1 (1-3)	AO1 3.2.3n

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3.6	platelets / small fragments of cells (stick to the wound site)		1 (4-5)	AO2 3.2.3p 3.2.3q
	starting a series of enzyme-controlled reactions	allow which causes prothrombin to convert to thrombin	1 (6-7)	AO1
	which results in fibrinogen changing to fibrin		1 (6-7)	AO1
	forming a network of fibres		1 (6-7)	AO1
	which trap the blood cells and form the clot / scab		1 (6-7)	AO1 extended response

		Total	**10**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4.1	heart rate		1 (4-5)	AO4 3.2.3d RPA4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4.2	any **two** from: • age • sex • exercise rate • rest time between each exercise	allow description of exercising at same rate eg. 1 step every 10 secs allow rest until heart rate returns to normal	2 (4-5)	AO4 3.2.3d RPA4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4.3	method for counting pulse method to measure time **or** record beats per unit time		1 (4-5) 1 (4-5)	AO4 3.2.3d RPA4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4.4	x- axis labelled number of step ups **and** y- axis labelled heart rate in beats per minute suitable scale for y - axis all points correct suitable smooth curve of best fit	 allow tolerance + / - half a small square allow 1 mark for 3 or 4 points correct	1 (4-5) 1 (4-5) 2 (6-7) 1 (6-7)	AO2 3.2.3d RPA4 Ma 6.3.9

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4.5	as the level of exercise increases so does the heart rate until it reaches a maximum at 15 step-ups **or** until it reaches a maximum at 174 beats per minute		1 (4-5) 1 (6-7)	AO3 3.2.3d RPA4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4.6	fatty material has built up inside the artery restricting the flow of blood so not enough oxygen / glucose reaches the heart muscle / cells		1 (6-7) 1 (6-7) 1 (6-7)	AO2 3.2.3e

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4.7	a stent		1 (4-5)	AO1 3.2.3e

		Total	**16**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5.1	3.1 – 2.5 = 0.6 (0.6 ÷ 2.5) x 100 = 24 (%)		1 (4-5) 1 (4-5) 1 (4-5)	AO2 3.5.3a 3.6.1 Ma 6.3.3

Question	Answers				Extra information	Mark	AO / Spec.
5.2			Characteristic			2 (4-5)	AO2 3.5.3a 3.6.1
			Male sex	**Brown eyes**	**Birth weight**		
	Cause of characteristic	**Genetic only**	✓	✓			
		Environmental only					
		Genetic and environmental			✓		
	Type of variation	**Continuous**			✓		
		Discontinuous	✓	✓			
	1 mark for each correct tick. do **not** award mark if more than one tick in each section.						

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5.3	father has gene(s) / allele(s) for brown eyes (which) passed into his sperm / gamete cell which fertilised egg (then) mitosis occurred so each embryo has same genes / alleles	ignore references to brown eyes being dominant over blue eyes.	1 (4-5) 1 (6-7) 1 (6-7) 1 (8-9)	AO2 3.5.3b 3.5.2i AO1 AO1 AO3

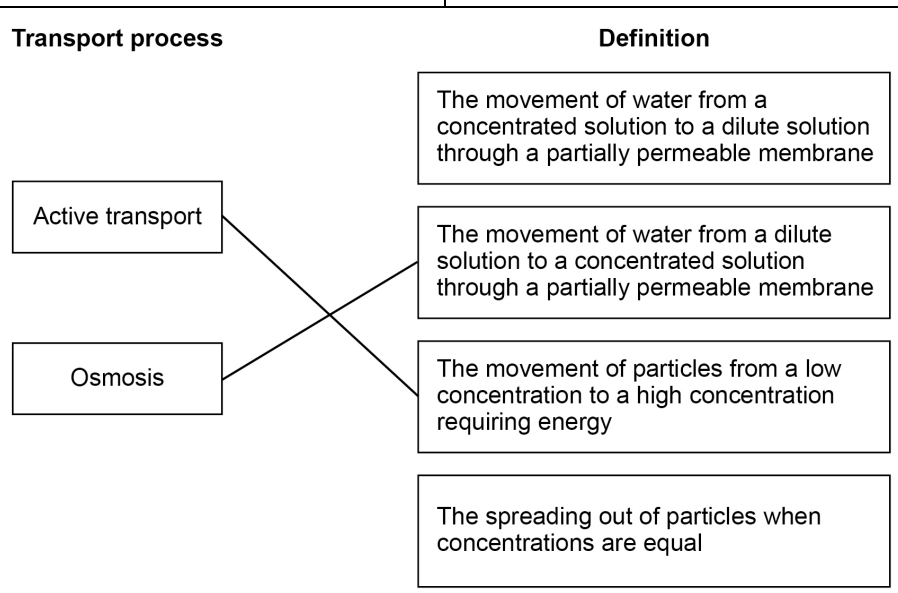
Question	Answers	Extra information	Mark	AO / Spec. Ref.
5.4	differentiation		1 (6-7)	AO1 3.5.2i

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5.5	(advantage -) will not be attacked by the patient's antibodies **or** patient will not need immunosuppressant drugs	allow will not be rejected by (the patient's) immune system	1 (6-7)	AO1 3.2.3r 3.2.3s 3.5.2l 3.5.2m
	(because) cells will have same (tissue) antigens on the surface	allow cells will be a tissue match	1 (8-9)	AO1
	(disadvantage -) involves a human embryo		1 (4-5)	AO3 3.5.2l
	which raises ethical concerns		1 (4-5)	AO3
		allow example e.g. embryo killed		linking

Question	Answers	Extra information	Mark	AO / Spec.
5.6	bone marrow	allow other examples eg blood, skin	1 (6-7)	AO1 3.5.2k

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5.7	cells placed in patient's body / pancreas (where they) produce insulin to control the blood glucose concentrations **or** to move glucose from the blood into the cells **or** to convert glucose to glycogen		1 (6-7) 1 (4-5) 1 (4-5)	AO2 3.5.2m AO1 3.4.5b 3.4.5d AO1 3.4.5b

		Total	**20**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6.1	 do not award mark if additional line drawn from one process		1 (4-5) 1 (6-7)	AO1 3.1.5d 3.1.5f

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6.2	diffusion		1 (4-5)	AO1 3.1.5c

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6.3	villi and / or microvilli increase the surface area (for greater absorption / diffusion / transport of molecules)		1 (6-7)	AO2 x 2 AO3 x 2 3.1.5i 3.1.5j
	(layer of cells covering villi are) only one cell thick which provides a short diffusion path	allow capillary walls are only one cell thick which provides a short diffusion path	1 (8-9)	
	a large capillary network (takes away absorbed molecules) which increases the concentration gradient for diffusion (into the blood)	allow the capillary network provides oxygen **and** glucose to release energy by respiration for active transport	1 (8-9)	
	cells covering villi have (many) mitochondria to transfer / release energy for active transport	allow other correct transport processes that require energy	1 (8-9)	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6.4	**Level 3:** Relevant points are identified, given in detail and logically linked to form a clear account.		5–6 (6-7)	AO3
	Level 2: Relevant points are identified, and there are attempts at linking. The resulting account in not fully clear.		3–4 (6-7)	AO2
	Level 1: Relevant points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.		1–2 (4-5)	AO1
	No relevant content		0	
	Indicative content Digestion • protein is broken down by protease • protein is broken down to amino acid(s) • this is shown by the (large) increase in amino acids in the small intestine after the meal • carbohydrate is broken down by amylase / carbohydrase • carbohydrate is broken down to glucose / sugar molecules • this is shown by the (large) increase in glucose in the small intestine after the meal • the small intestine contains protease, amylase / carbohydrase (and water) so the digestion can take place here • (but) there is amylase in the saliva / mouth and protease in the stomach so some was probably digested before it reached the small intestine Transport • starch / carbohydrate molecules are large / insoluble • (so) can't pass through the membrane • this is shown by there being zero starch in the blood • amino acids are absorbed against the concentration gradient when fasting (570 compared to 1250) so it must be active transport • after the meal the concentration of amino acids is greater in the intestine than the blood (9500 compared to 1500) so it is transported by diffusion • same arguments for glucose as amino acids quoting concentrations.			3.1.5a 3.1.5b 3.1.5f 3.1.5g 3.2.4a 3.2.4c

	For level 3 students must refer to digestion of proteins and carbohydrate, refer to transport and give comparative data.		

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6.5	(due to the increased concentration of her blood) the pituitary gland released ADH which caused increased reabsorption of water in the kidney (tubules)		1 (8-9) 1 (8-9)	AO1 3.4.2a 3.4.3e AO1

		Total	**15**	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7.1 view with Figure 7	eating / feeding		1 (4-5)	AO1 3.3.3e

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7.2 mark with 7.3	$6CO_2 + 6H_2O$ $C_6H_{12}O_6 + 6O_2$	 allow 1 mark for correct formulae but not balanced	1 (6-7) 1 (6-7)	AO2 AO1 3.2.1a 3.3.3e

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7.3 mark with 7.2	$C_6H_{12}O_6 + 6O_2$ $6CO_2 + 6H_2O$	 allow 1 mark for correct formulae but not balanced allow 2 marks if equations are correct but interchanged between 7.2 and 7.3	1 (6-7) 1 (6-7)	AO2 AO1 3.2.6c 3.3.3e

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7.4	correct graph readings 10.2 and 6.0 4.2 (a.u.)	allow ± half small square	1 (4-5) 1 (4-5)	AO2 3.3.3b 6.3.11

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7.5	two sets of correct readings from the line	eg 34.5, 11.8 and 40, 10.2	1 (8-9)	AO2 3.3.3b 6.3.11
	$\frac{\Delta y}{\Delta x}$ for the line	eg $\frac{1.6}{(-)\ 5.5}$	1 (8-9)	
	gradient	(-) 0.29 (a.u. / °C) allow values between (-) 0.28 and (-) 0.30	1 (8-9)	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7.6	activity of enzymes responsible for decay increases with temperature **or** enzyme reactions in microorganisms increase with temperature	allow increased temperature causes increased molecular movement leading to faster reaction rate of enzymes	1 (8-9)	AO3 3.3.3b 3.2.4b
	up to 38°C after which rate falls due to denaturation (of enzymes)	allow description of denaturation	1 (8-9)	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7.7	(they need to be added and removed by processes) at equal rates		1 (6-7)	AO1 3.3.3d

		Total	**13**	