

Mark Scheme (Results)

January 2014

International GCSE Human Biology  
(4HB0) Paper 01

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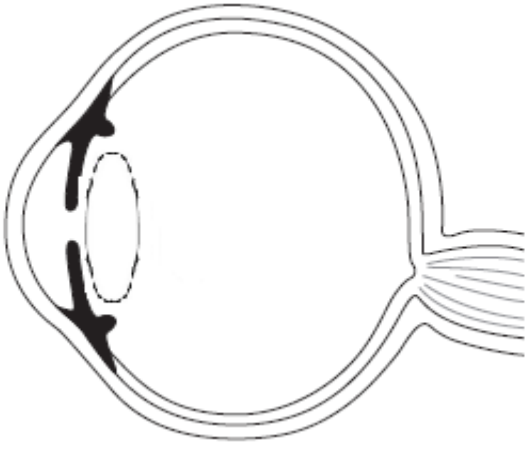
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## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question number	Answer	Notes	Marks
1 (a)	C;		1
(b)	D;		1
(c)	A;		1
(d)	B;		1
(e)	B;		1
(f)	D;		1
(g)	C;		1
(h)	A;		1
(i)	D;		1
(j)	C;		1

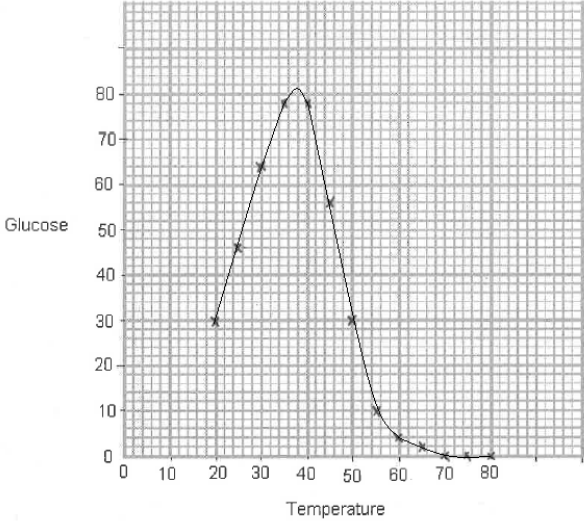
**Total Question 1 = 10 marks**

Question number	Answer	Notes	Marks
2 (a)	correct position; biconvex; e.g.		1 1
			

Question number	Answer	Notes	Marks
2(b)	focus light rays/refract light (rays); on retina;	Accept to focus (images/on objects)	1 1

Question number	Answer	Notes	Marks
2 (c)	(distant object) ciliary muscles relax; suspensory ligaments become tight; lens pulled thin/becomes thinner/flatter/less convex;	Accept reverse for near object	1 1 1

**Total Question 2 = 7 marks**

Question number	Answer	Notes	Marks
3(a)(i)	<p>axes labels with units correct way round;</p> <p>suitable scales;</p> <p>all points correctly plotted +/- ½ square; ; ( - 1 for each incorrect point)</p> <p>suitable line;</p> 		<p>1</p> <p>1</p> <p>2</p> <p>1</p>

Question number	Answer	Notes	Marks
3a(ii)	<p>36 – 40°C;</p> <p>no points in this area so could be either/graph peaks at (36-40 °C)/optimum temperature for enzyme activity/chemical reaction</p>		<p>1</p> <p>1</p>

Question number	Answer	Notes	Marks
3 (a) (iii)	saliva from the same source;  volume of saliva /concentration of mixture/starch/amylase/enzyme/carbohydrase;  pH;	Allow amount for volume	2 max

Question number	Answer	Notes	Marks
3 (iv)	(salivary) amylase/carbohydrase;  enzyme;  breaks down/hydrolyses starch molecule;		2 max

Question number	Answer	Notes	Marks
3 (a)(v)	above optimum temperature;  enzyme/amylase/carbohydrase denatured;  by breaking of (hydrogen) bonds;  loss of shape of active site;  can't catalyse reaction/no enzyme substrate complexes/cannot bind to substrate/shape no longer complementary to substrate;		3 max

Question number	Answer	Notes	Marks
3 (b)	indication of sample of mixture taken; add iodine; <u>solution</u> ; if blue-black colouration occurs starch present; starch absent if no/different colour change;		4 max

**Total Question 3 = 18 marks**



Question number	Answer	Notes	Marks
4	arteries; capillaries; tissue fluid; glucose; oxygen; carbon dioxide; urea; lymph vessels;	} either order } } either order	1 1 1 1 1 1 1 1

**Total Question 4 = 8 marks**

Question number	Answer	Notes	Marks
5 (a)	A; D; C; E; B;		5

Question number	Answer	Notes	Marks												
5 (b)	<table border="1"> <thead> <tr> <th>Nervous system</th> <th>Endocrine system</th> </tr> </thead> <tbody> <tr> <td>fast transmission</td> <td>slow transmission;</td> </tr> <tr> <td>electrochemical / electrical signal/impulses</td> <td>hormones/chemical;</td> </tr> <tr> <td>transmitted through nerve cells</td> <td>travel through blood;</td> </tr> <tr> <td>short-lived response</td> <td>prolonged response</td> </tr> <tr> <td>specific target area (localised)</td> <td>acts over wider area</td> </tr> </tbody> </table>	Nervous system	Endocrine system	fast transmission	slow transmission;	electrochemical / electrical signal/impulses	hormones/chemical;	transmitted through nerve cells	travel through blood;	short-lived response	prolonged response	specific target area (localised)	acts over wider area		3 max
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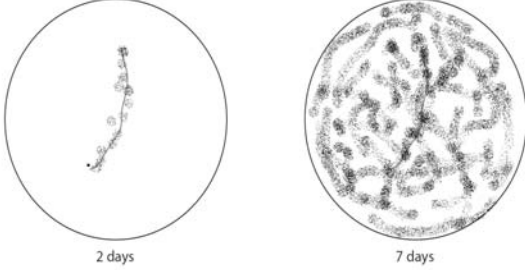
**Total Question 5 = 8 marks**

Question number	Answer	Notes	Marks
6(a)(i)	Bacteria/bacillus/named example;		1
	fungi/named example;		1

Question number	Answer	Notes	Marks
6(a)(ii)	B		1

Question number	Answer	Notes	Marks
6(a)(iii)	optimum temperature for growth;		1
	dormant at 0°C /reproduction too slow/growth suppressed;		1
	killed at 70°C/100°C/enzymes denatured;		1

Question number	Answer	Notes	Marks
6(a)(iv)	micro organisms can enter from air during hair transfer/hands transfer microorganisms to hair / OWTTE;		1

Question number	Answer	Notes	Marks
6 (b)	diagram showing colonies around hair after 2 days;		1
	diagram showing colonies covering agar after 7 days;		1
			

Question number	Answer	Notes	Marks
6(c)	dish with no hair;		1
	for comparison;		1
	to prove micro organisms came from hair;		1

Question number	Answer	Notes	Marks
6(d)	antiseptic kills/restricts growth of bacteria; fewer/no microorganisms; after 2 days/7 days/ both periods of incubation;		2 max

Total Question 5 = 14 marks

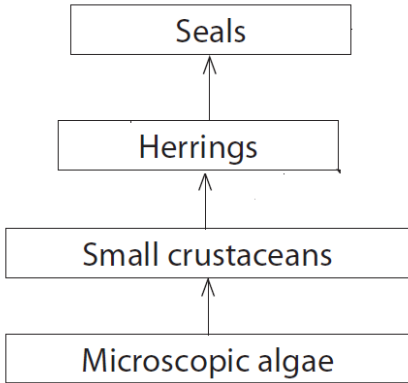
Question number	Answer	Notes	Marks
7 (a)	duodenum/small intestine; gall bladder; liver; oesophagus;	Accept gullet	1 1 1 1

Question number	Answer	Notes	Marks
7 (b)	insulin; <u>glucagon</u> ;  amylase/carbohydrase; trypsin (protease); lipase; sodium bicarbonate	} accept hormones as an alternative to both(1)  } accept enzymes as an alternative to all three (1)	3 max

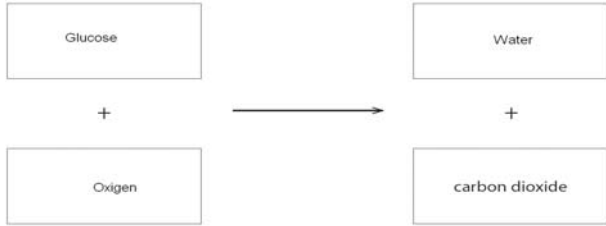
Question number	Answer	Notes	Marks
7 (c)	as a bolus; by peristalsis; contraction of muscles in wall; push/move/bolus/food along/down (towards stomach);		3 max

Question number	Answer	Notes	Marks
7 (d)	bile; emulsifies fats/ breaks fats into small droplets; increase surface area (of fats); more effective/faster digestion; by lipase; neutralises stomach acid/creates alkaline conditions; optimum pH/conditions for enzymes;		4 max

**Total Question 7 = 14 marks**

Question number	Answer	Notes	Marks
8 (a)	<p>four names correct;</p> <p>in correct sequence;</p> <p>arrows pointing in right direction;</p> <p>e.g.</p> 		<p>1</p> <p>1</p> <p>1</p>

Question number	Answer	Notes	Marks
8(b)	Sunlight;	Accept light from the Sun	1

Question number	Answer	Notes	Marks
8 (c)	<p>Name of process: aerobic; respiration;</p>  <p>glucose;</p> <p>oxygen;</p> <p>water;</p>		<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>

**Total Question 8 = 9 marks**

Question number	Answer	Notes	Marks
9 (a)(i)	F		1

Question number	Answer	Notes	Marks
9 (a) (ii)	quiet breathing/breathing at rest;		1
	0.5 dm <sup>3</sup> ;		1

Question number	Answer	Notes	Marks
9 (a)(iii)	4.5 dm <sup>3</sup> ;		1

Question number	Answer	Notes	Marks
9(a)(iv)	1.0 dm <sup>3</sup> ;		1
	air that remains in the lungs/air that is not/can't be exhaled;		1
	after a person has (forcefully) exhaled;		1

Question number	Answer	Notes	Marks
9 (b) (i)	increase in depth of breathing/increase in tidal volume;		1
	and rate;		1



Question number	Answer	Notes	Marks
9(b)(ii)	5 – 6 minutes;		1

Question number	Answer	Notes	Marks
9 (c)	<p>(between R and S) oxygen supply less than demand;</p> <p>anaerobic respiration;</p> <p>oxygen debt builds up;</p> <p>lactic acid produced;</p> <p>(between T and U) lactic acid broken down/debt repaid using oxygen/aerobically;</p> <p>in liver;</p> <p>to carbon dioxide and water</p>		4 max

**Total Question 9 = 14 marks**

Question number	Answer	Notes	Marks
10(a)	mitochondrion/cristae/inner membrane;		1
	aerobic respiration/releases energy/produces ATP;		1
	ribosome/endoplasmic reticulum;		1
	protein synthesis;		1

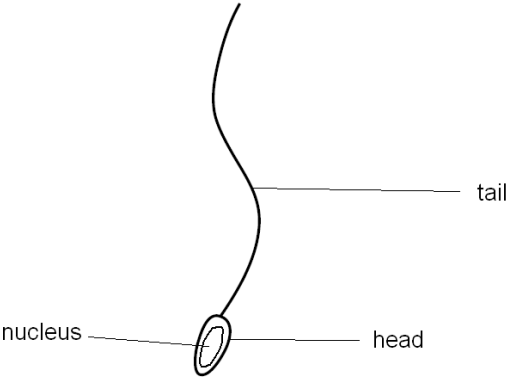
Question number	Answer	Notes	Marks
10(b)	electron microscope has a higher magnification;	reverse argument applies	
	ribosome and mitochondrion too small to be seen under light microscope/light microscope shows less detail/only shows nucleus, cell membrane/ can only be seen under an electron microscope;		
	greater resolution/clarity;		2 max

Question number	Answer	Notes	Marks
10 (c)	fewer/no mitochondria;  less/no energy transferred; biconcave (disc) owtte;  fewer/no ribosomes/less/no endoplasmic reticulum;  less protein required/no proteins made;  fewer/no golgi apparatus;  no nucleus;  space needed for haemoglobin;	Allow no/less organelles if no named organelle given  Accept less/no energy released	4 max

**Total Question 10 = 10 marks**

Question number	Answer	Notes	Marks
11(a)(i)	A = penis; B = prostate; D = testis;	Accept testicle(s)/testes	1 1 1

Question number	Answer	Notes	Marks
11(a)(ii)	secrete fluids; in which sperms swim; provides nutrients/sugar for sperm;; neutralises acid;		2 max

Question number	Answer	Notes	Marks
11(b)	diagram; tail/flagellum/head/nucleus / midpiece/mitochondria/acrosome;; 		1 2 max

**Total Question 11 = 8 marks**



