

Mark Scheme (Final)

Summer 2008

GCE

GCE Biology (6112/01)

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.

PRE-STANDARDISATION MARK SCHEME - UNIT 2H (6112)
AS BIOLOGY / BIOLOGY (HUMAN) June 2008

STRICTLY CONFIDENTIAL

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- (1) You must have provisionally marked 15 of every item **ONLINE** before the Standardisation Meeting on **13/06/2008** in order to familiarise yourself with the Pre-standardisation mark scheme.
- (2) At the meeting the mark scheme will be discussed and amplified. It will be amended in the light of the discussion and of marking experience. Assistant Examiners will then be asked to take part in an Agreement Trial. The marks will be compared and discussed. Scripts used in Agreement Trials may be taken away from the meeting for reference purposes; these must be **destroyed** at the conclusion of marking.
- (3) Within **48 hours** of the Standardisation meeting, Assistant Examiners must mark fully, **ONLINE**, a sample of **10** of every item in the light of the amended **FINAL** mark scheme which you will be able to access **ONLINE**. Please note that you will not be able to mark any more responses until after you have received clearance from your Team Leader, and any differences are resolved.
- (4) Once clearance has been received from the Team Leader, you **MUST** start marking and all your marking **MUST** be done **by the contract completion date on your contract**.
- (5) Further checks on your marking will be made by your Team Leader at any point throughout the marking period to ensure that your marking is accurate.

Please contact the ePEN helpdesk for technical queries:

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Question Number	Answer	Mark
1	<p>1. anterior ;</p> <p>2. follicle stimulating hormone / FSH ;</p> <p>NOT 'FSH and LH' IGNORE gonadotrophin</p> <p>3. follicles ;</p> <p>NOT 'Graafian follicles'</p> <p>4. secondary oocyte / 2° oocyte ;</p> <p>IGNORE 'egg' or 'ovum' so 'secondary oocyte (ovum)' is acceptable.</p> <p>Comments ACCEPT reasonable spellings e.g. 'follical', 'ocyte', 'oosite'.</p>	(4)

Question Number	Answer	Mark
2(a)	<p>A erythrocyte / red blood cell / red blood corpuscle ; ACCEPT 'RBC'</p> <p>B lymphocyte /agranulocyte ; IGNORE 'white blood cell' or 'leucocyte' ACCEPT reasonable spelling e.g. limphosite, limfosite</p>	(2)

Question Number	Answer	Mark
2(b)	<p>1. reference to biconcave (disc) / thin / large surface area / description of shape ; ACCEPT clear diagram</p> <p>2. reference to <u>diffusion</u> of respiratory gases / oxygen / carbon dioxide ; e.g. a reference 'to shorter diffusion distance for oxygen' or 'oxygen can diffuse easily'</p> <p>OR</p> <p>1. small / flexible / eq ; 2. to pass through <u>capillaries</u> ;</p> <p>NOT 'arteries, veins and capillaries' or 'blood vessels'</p> <p>Comments Explanation should be related to shape.</p>	(2)

Question Number	Answer	Mark
2(c)	<p>1. {neutrophils / eosinophils} are {phagocytic / eq} ;</p> <p>2. monocytes are {phagocytic / eq} ;</p> <p>3. reference to phagocytosis of {bacteria /eq} ;</p> <p>ACCEPT a description of the process, e.g. 'bacteria are engulfed'</p> <p>ACCEPT alternatives for bacteria, such as pathogens or microorganisms, but not 'foreign bodies', or 'germs'</p> <p>4. (B) lymphocytes secrete antibodies /eq ;</p> <p>ACCEPT 'plasma cells secrete antibodies' 'release' as equivalent to 'secrete'</p> <p>5. in presence of antigens / function of antibody / antitoxins / eq ;</p> <p>6. reference to production of memory cells ;</p> <p>ACCEPT a correct reference to T lymphocytes</p> <p>e.g. a reference to 'T helper cells' or 'T killer cells' is acceptable</p> <p>ACCEPT eosinophils {secrete major basic protein / are involved in defence against worm infection}</p> <p>ACCEPT basophils secrete {heparin / histamine}</p> <p>Comments Mark points 3, 5 and 6 could be awarded as stand-alone points e.g. in the context of wbc or leucocytes 'they engulf bacteria and produce antibodies in the presence of antigens' gains mark points 3 and 5 but not 4</p> <p>Mark points 1, 2 and 4 must be linked to the correct type of cell</p> <p>'neutrophils engulf bacteria' gains mark points 1 and 3</p>	max (3)

Question Number	Answer	Mark
3(a)	<p>1. capillaries {have thin walls / made of flattened epithelium / thin cells / eq} ;</p> <p>NOT 'one cell thick' or 'thin membrane' or 'thin cell wall' ACCEPT endothelium</p> <p>2. reference to presence of <u>pores</u> ;</p> <p>3. reference to basement membrane ;</p> <p>4. reference to permeability of capillary wall /eq ;</p> <p>e.g. 'permeable to small molecules', 'selectively permeable' or 'semi-permeable' or 'allows small molecules to pass out'</p> <p>ACCEPT named examples of small molecules, such as glucose and water</p>	max (3)

Question Number	Answer	Mark
3(b)	<p>1. proteins are large (molecules) ;</p> <p>ACCEPT 'proteins have a high RMM'</p> <p>2. cannot pass through capillary wall / eq ;</p> <p>e.g. 'cannot pass through pores'</p> <p>Comments 'Protein molecules are too big to pass through the pores' gains both marks</p>	(2)

Question Number	Answer	Mark
3(c)	<p>1. idea of reduced concentration of plasma proteins / eq ;</p> <p>Comments It should be clear that proteins are in the blood / plasma / inside capillaries, rather than dietary proteins</p> <p>2. therefore reduced osmotic effect / eq ;</p> <p>ACCEPT references to solute potential, or water potential</p> <p>'lower' / 'less' / 'smaller' are equivalent to reduced</p> <p>'no protein therefore no osmotic effect' gains both marks</p>	(2)

Question Number	Answer	Mark
4(a)	<p>1. reference to (salivary / pancreatic) amylase ;</p> <p>ACCEPT amalase but NOT amylyse</p> <p>2. breaks down starch to <u>maltose</u> (and dextrans) ;</p> <p>3. maltase ;</p> <p>4. breaks down maltose to (α) <u>glucose</u> ;</p> <p>NOT β glucose</p>	<p>max (3)</p>

Question Number	Answer	Mark
4(b)(i)	<p>1. (villi) increase the surface area ;</p> <p>2. reference to increasing <u>diffusion</u> ;</p> <p>NOT 'increasing uptake'</p>	<p>(2)</p>

Question Number	Answer	Mark
4(b)(ii)	<p>1. reference to transport (of (absorbed) monosaccharides / named monosaccharides) ;</p> <p>2. maintains {diffusion / concentration} gradient / eq ;</p> <p>e.g. 'glucose is taken away in the blood and this maintains a diffusion gradient' gains both mark points</p> <p>'glucose is absorbed by blood because it has a low concentration' gains m pt 2</p>	<p>(2)</p>

Question Number	Answer	Mark
4(c)(i)	<ol style="list-style-type: none"> 1. uptake of galactose is {fastest / faster than glucose / fructose} ; 2. uptake of fructose is {slowest / slower than glucose / galactose} ; 3. glucose and galactose have similar rates of uptake ; <p>Comments ACCEPT converse comparisons</p> <p>ACCEPT 'absorption' as equivalent to 'uptake' and 'higher' as equivalent to 'faster'</p> <p>Expect comparative points</p> <p>'uptake of glucose is faster than fructose but slower than galactose' gains both marks</p> <p>'fructose is slower than glucose which is slower than galactose' is worth 2 marks</p>	max (2)

Question Number	Answer	Mark
4(c)(ii)	reference to {specific / more} glucose {carrier proteins / eq} / glucose is absorbed actively, but fructose by (facilitated) diffusion / glucose is absorbed by glucose-sodium co-transport, fructose by diffusion ;	(1)

Question Number	Answer	Mark												
5	<table border="1" data-bbox="395 286 1161 701"> <thead> <tr> <th data-bbox="395 286 651 389">Epithelia</th> <th data-bbox="655 286 911 389">Name</th> <th data-bbox="916 286 1161 389">One location</th> </tr> </thead> <tbody> <tr> <td data-bbox="395 396 651 499"></td> <td data-bbox="655 396 911 499">squamous / pavement ;</td> <td data-bbox="916 396 1161 499">alveoli ;</td> </tr> <tr> <td data-bbox="395 506 651 609"></td> <td data-bbox="655 506 911 609">columnar ;</td> <td data-bbox="916 506 1161 609">ileum ;</td> </tr> <tr> <td data-bbox="395 616 651 701"></td> <td data-bbox="655 616 911 701">cuboidal ;</td> <td data-bbox="916 616 1161 701">nephron ;</td> </tr> </tbody> </table> <p data-bbox="395 734 1214 837">Notes: The locations are those in the specification; there are other acceptable answers</p> <p data-bbox="395 871 1214 1010">ACCEPT Squamous : lining of blood vessels / capillary walls / skin / lining of the cheeks / Bowman's capsule / oesophagus / eq.</p> <p data-bbox="395 1043 1214 1146">Columnar : ignore ref. to ciliated and brush borders. Trachea / digestive tract / stomach / duodenum / colon / fallopian tubes / uterus / gall bladder / eq.</p> <p data-bbox="395 1180 1214 1247">Cuboidal : PCT / DCT / loop of Henle / (salivary / pancreatic ducts / thyroid gland / eq.</p>	Epithelia	Name	One location		squamous / pavement ;	alveoli ;		columnar ;	ileum ;		cuboidal ;	nephron ;	max (6)
Epithelia	Name	One location												
	squamous / pavement ;	alveoli ;												
	columnar ;	ileum ;												
	cuboidal ;	nephron ;												

Question Number	Answer	Mark
6(a)	<ol style="list-style-type: none"> 1. evaporation of water (in sweat) ; 2. (evaporation) has a cooling effect / eq ; 3. appropriate {reference to / description of} latent heat ; 	max (2)

Question Number	Answer	Mark
6(b)(i)	<ol style="list-style-type: none"> 1. temperature dropped {from 0 to 15 minutes / when in the bath} ; 2. increased {from 15 to 25 minutes / when sitting on the chair} ; 3. lowest {at 15 minutes / when 'he got out of bath'}; 4. credit a manipulated change in temperature ; 	max (3)

Question Number	Answer	Mark
6(b)(ii)	<p>5 to 10 minutes:</p> <ol style="list-style-type: none"> 1. temperature of water lower than body temperature / eq ; 2. heat lost by conduction (to water) ; <p>15 to 25 minutes ;</p> <ol style="list-style-type: none"> 3. increased metabolism / shivering / eq ; 4. generates heat / eq ; 	max (3)

Question Number	Answer	Mark
7(a)(i)	<ol style="list-style-type: none"> 1. soda lime {absorbs / eq} carbon dioxide ; 2. prevents carbon dioxide accumulating / eq (in spirometer) ; 3. reference to harmful effect of breathing increased carbon dioxide ; 4. can also measure the volume of oxygen used ; 	max (2)

Question Number	Answer	Mark
7(a)(ii)	<ol style="list-style-type: none"> 1. nose clip on person ; 2. ref. to calibrating chart ; 3. switch on chart recorder ; 4. person breathes through mouthpiece ; 5. deep breath in then fully out/ eq / $VC = IRV + TV + ERV$; 6. read volume from chart; 	max (3)

Question Number	Answer	Mark
7(b)(i)	<ol style="list-style-type: none"> 1. calculation ; 2. answer (= 92.9) ; ACCEPT 93% 	(2)

Question Number	Answer	Mark
7(b)(ii)	<ol style="list-style-type: none"> 1. (as cycling speed increases) more carbon dioxide produced ; 2. {carbon dioxide / low pH} stimulates breathing / eq ; 3. increased need for oxygen / eq ; 	max (2)

Question Number	Answer	Mark
8(a)(i)	0.6 to 0.65 ;	(1)

Question Number	Answer	Mark
8(a)(ii)	3.1 to 3.15;	(1)

Question Number	Answer	Mark
8(b)	<p>1. idea that oxygen is transferred from haemoglobin to myoglobin ;</p> <p>e.g. 'myoglobin takes up oxygen from haemoglobin' IGNORE reference to affinity</p> <p>2. myoglobin acts as a {store / eq} of oxygen ;</p> <p>e.g. 'a reserve (supply) of oxygen' NOT transports oxygen</p> <p>3. in muscle (tissue) ;</p> <p>4. oxygen released from myoglobin at (very) low partial pressures / during {extreme / strenuous / eq} exercise ;</p> <p>Comments 'exercise' should be qualified in some way for this point, i.e. not just exercise on its own</p> <p>5. this allows <u>aerobic</u> respiration to continue / eq ;</p> <p>e.g. 'so muscles can keep respiring aerobically' or 'to prevent anaerobic respiration'</p>	<p>max (3)</p>

Question Number	Answer	Mark
8(c)	<ol style="list-style-type: none"> 1. idea that respiring {tissues / cells} produce carbon dioxide ; 2. reference to reduced <u>affinity</u> for oxygen ; 3. oxygen is released (more) readily / (more) oxygen is released / haemoglobin is less saturated with oxygen / percentage saturation decreases / eq ; 4. at {a given / the same} partial pressure of oxygen / eq ; 5. (oxygen released) to tissues / cells / muscle /eq ; <p>e.g. 'oxygen is available to cells' or 'oxygen given to cells'</p> <p>ACCEPT oxygen concentration as equivalent to partial pressure of oxygen</p> <p>Comment 'oxygen released to muscles' gains m pt 3 and 5</p>	<p>max (4)</p>