



GCE MARKING SCHEME

SUMMER 2015

**HUMAN BIOLOGY - HB2
1072/02**

INTRODUCTION

This marking scheme was used by WJEC for the 2016 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

GCE HUMAN BIOLOGY - HB2

SUMMER 2016 MARK SCHEME

Question		Marking details	Marks Available																		
1	(a)	1 mark per correct row: <table border="1" data-bbox="414 477 1236 860"> <thead> <tr> <th>Taxon</th> <th>Group</th> <th>Classification of modern humans</th> </tr> </thead> <tbody> <tr> <td>KINGDOM</td> <td>B</td> <td>ANIMALIA</td> </tr> <tr> <td>PHYLUM</td> <td>E</td> <td>CHORDATA</td> </tr> <tr> <td>CLASS</td> <td>A</td> <td>MAMMALIA</td> </tr> <tr> <td>ORDER</td> <td>C</td> <td>PRIMATES</td> </tr> <tr> <td>FAMILY</td> <td>D</td> <td>HOMINIDAE / HOMINIDS</td> </tr> </tbody> </table>	Taxon	Group	Classification of modern humans	KINGDOM	B	ANIMALIA	PHYLUM	E	CHORDATA	CLASS	A	MAMMALIA	ORDER	C	PRIMATES	FAMILY	D	HOMINIDAE / HOMINIDS	4
	Taxon	Group	Classification of modern humans																		
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(b)	<i>Homo sapiens</i> correct spelling only	1																			
(c)	Any 2 from: all eukaryotic cells/ membrane bound organelles/ named organelles; NOT chloroplast no cell walls; multicellular;	2																			
(d)	bacteria – peptidoglycan/ murein; plants – cellulose; fungi- chitin;	3																			
		Question 1 total	[10]																		

Question		Marking details	Marks Available	
2	(a)	(i) Both for 1 mark: 1 = ingestion 4 = egestion	1	
		(ii) Any 2 from <ul style="list-style-type: none"> (Humans have a varied diet and so) each part of the gut carries out a particular function/ OWTTE; Accept mechanical and chemical digestion can be separated/ different food types can be digested under different conditions/ different adaptations for digestion/ absorption provide different <u>pH</u> for different enzyme action; (more) efficient digestion of food; 	max 2	
	(b)	(i) X – label line to epithelium; Y – label line to lacteal;	2	
		(ii) hepatic portal vein	1	
		(iii) {deaminated / amino groups are removed} / {NH ₂ /amino group} converted to urea; remainder is converted to carbohydrate (and stored);	2	
	(c)	(i) ileum; colon/ large intestine/ caecum;	2	
		(ii) Any 2 from <ul style="list-style-type: none"> (diarrhoea) reduces ability to absorb nutrients/ less {salts/ glucose} absorbed; salts needed to restore ionic balance of blood / for absorption / co-transport of nutrients; glucose needed for {ATP synthesis/ active transport/ respiration}; 	2	
		(iii) Any 2 from <ul style="list-style-type: none"> many (strains already) resistant to antibiotics/ Cholera is gram negative and so protected from antibiotics; reduce risk of antibiotic resistance; antibiotics not required – rehydration treatment usually sufficient/ OWTTE; 	2	
	Question 2 total			[14]

Question			Marking details	Marks Available
3	(a)	(i)	X = venous end;	1
		(ii)	lower pCO ₂ / high pO ₂ ; Accept references to levels of CO ₂ / O ₂	1
	(b)	(i)	5.1	1
		(ii)	Concentration of CO ₂ in alveolus and {plasma / blood} {reaches equilibrium/ is balanced/ is the same/ no further diffusion}/ OWTTE;	1
	(c)		{Decreases/ short} diffusion distance;	1
	(d)		reduces surface tension; keeps alveoli open/ prevents (walls of) alveoli collapsing/ prevents the inside of the alveoli sticking together;	2
	Question 3 Total			[7]

Question		Marking details	Marks Available
4	(a)	<p>outer layer: (inelastic) {collagen / connective tissue} to resist pressure/ prevent overstretching;</p> <p>middle layer: {elastic fibres/ muscle} for {stretch/ recoil}/ muscle {to adjust diameter of artery/ {for constriction/ dilation}</p> <p>inner layer: (endothelium) smooth to reduce friction;</p>	3
	(b)	(i) I A - 2 of {urea/ carbon dioxide/ water/ salts}; for 1 mark; II B - 2 of {glucose / amino acids/ water / oxygen/ other correct substance} for 1 mark;	2
		(ii) Any 2 from <ul style="list-style-type: none"> • increase in friction/ increased resistance to flow; • increase in total cross-sectional area; Reject surface area • decrease in volume of blood/ (reduced pressure)as water is pushed out; 	2
		(iii) Protein;	1
		Question 4 Total	[8]

Question		Marking details		Marks Available										
5	(a)	(i)	E / bone marrow	1										
		(ii)	B / thymus gland	1										
		(iii)	D / lymph vessels	1										
		(iv)	A / lymph nodes; C / spleen;	2										
	(b)	(i)	<table border="1"> <thead> <tr> <th>Type of Immune response</th> <th>Name of response</th> <th>Name of lymphocytes responsible</th> </tr> </thead> <tbody> <tr> <td>Type 1</td> <td>humoral;</td> <td>B;</td> </tr> <tr> <td>Type 2</td> <td>cell-mediated;</td> <td>T;</td> </tr> </tbody> </table>		Type of Immune response	Name of response	Name of lymphocytes responsible	Type 1	humoral;	B;	Type 2	cell-mediated;	T;	4
			Type of Immune response	Name of response	Name of lymphocytes responsible									
			Type 1	humoral;	B;									
		Type 2	cell-mediated;	T;										
		(ii)	memory cells: recognise antigen (if encountered again); initiate a {faster/stronger} immune response/ reduce latent period/ more {plasma cells/antibodies} produced; Reject incorrect references to cell mediated responses		2									
			plasma cells; {synthesise / produce} specific antibodies/ OWTTE; {Secrete/ release} antibodies (into plasma); Reject incorrect references to cell mediated responses		2									
Question 5 Total			[13]											

Question		Marking details	Marks Available
6	(a)	$(14.51 - 13.52 / 13.52) \times 100;$ = 7.3% (Accept 7.32%) Correct answer = 2 marks	2
	(b)	(lowered pH) reduces the oxygen affinity of haemoglobin/ H^+ displace oxygen from haemoglobin; oxygen released more readily (at a higher pO_2) / more O_2 released;	2
	(c)	Any 4 from: <ul style="list-style-type: none"> • higher CO_2 concentration in venous blood; • CO_2 converted to HCO_3^- ions in red blood cells; • HCO_3^- ions passed out (into plasma); • chloride shift / movement of Cl^- ions into rbc's; • Use of data; 	max 4
		Question 6 Total	[8]

Question		Marking details	Marks Available
7	(a)	<p>With reference to named examples, describe and explain how diseases caused by microorganisms are transmitted and how transmission of these diseases can be reduced or prevented.</p> <p>A Transmission: Contaminated food</p> <p>B Example: <i>Salmonella</i> / Salmonellosis ; <i>E.coli</i></p> <p>C Prevention: thorough cooking / store under cool conditions / improved hygiene/ OWTTE</p> <hr/> <p>D Transmission: {Faecal/ sewage} contaminated water</p> <p>E Example: <i>Vibrio cholera</i> / Cholera</p> <p>F Prevention: {sterilise/ sanitise/ boil} drinking water/ better treatment of sewage Reject clean water</p> <hr/> <p>G Transmission: {Aerosol/ droplet/ airborne} transmission / coughing/ sneezing</p> <p>H Example: <i>M.tuberculosis</i> / TB</p> <p>I Prevention: (BCG) vaccination programme</p> <hr/> <p>J Transmission: Animal transfer / vector/ named vector</p> <p>K Example: <i>Plasmodium</i> / Malaria</p> <p>L + M Prevention: description of two suitable methods of preventing transmission</p> <hr/> <p>N Other method of transmission + a relevant example eg., unprotected sex - <i>Syphilis</i> / sharing needles – hepatitis</p> <p>O Description of a suitable method to prevent transmission of the disease named in N</p> <p>Award N and O if references made to transmission of viruses</p> <p>Question 7 a Total</p>	[10]
			[10]

Question		Marking details	Marks Available
7	(b)	<p>Describe how people become infected with <i>Taenia solium</i>, <i>Ascaris</i> and <i>Schistosoma</i> and how each is adapted to survive and infect other hosts</p> <p><i>Taenia solium</i> / Pork tapeworm</p> <p>A infection by eating {undercooked / raw} pork/ eating {undercooked / raw} pork containing {infective stages / larvae} Reject contamination of eggs</p> <p>B scolex / hooks and suckers Reject Hookers</p> <p>C to prevent being dislodged due to peristalsis/ OWTTE</p> <p>D thick cuticle / produce mucus / enzyme inhibitors Accept descriptions of</p> <p>E prevent action of (digestive) {enzymes/ HCl/ acid}</p> <p>F No/ reduced digestive system</p> <p>G absorbs pre-digested nutrients through body {wall/ surface}</p> <p>H Proglottids / segments are hermaphrodite / self-fertile/ description of hermaphrodite</p> <p>I No need to find a mate to produce eggs</p> <p><i>Ascaris lumbricoides</i> / <i>Ascaris</i></p> <p>J infection through ingesting eggs</p> <p>K Eggs can survive for a long time / are difficult to {kill / destroy}</p> <p><i>Schistosoma</i> /Schistosomiasis / Bilharzia</p> <p>L infection through larval forms penetrating skin when in (fresh) water. Accept reference to snail as host</p> <p>M Eggs have spines to escape from blood into intestine / bladder</p> <p>award N and O once only in reference to any of the species</p> <p>N ref to production of large numbers of {eggs/ larvae}</p> <p>O to increase chance of infecting (a new host / secondary host)</p> <p>Question 7 b Total</p>	[10]
			[10]