

Mark Scheme (Final)

Summer 2008

GCE O

GCE O Human Biology (7042/01)

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.

Question Number	Answer	Mark
1(a)	<ul style="list-style-type: none"> • X - pelvis / hip; • Y - tibia / patella; 	(2)

Question Number	Answer	Mark
1(b)(i)	<ul style="list-style-type: none"> • blood cells; 	(1)

Question Number	Answer	Mark
1(b)(ii)	<ul style="list-style-type: none"> • lighter (but still strong) / stronger per unit mass; • less energy to move around; • less minerals needed to form it; 	max (2)

Question Number	Answer	Mark
1(c)(i)	<ul style="list-style-type: none"> to prevent / reduce friction / shock absorber; 	(1)

Question Number	Answer	Mark																					
1(c)(ii)	<p>1 mark for each difference - maximum 3 marks</p> <table border="1"> <thead> <tr> <th>Difference</th> <th>Bone</th> <th>Cartilage</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>rigid/ not flexible</td> <td>flexible</td> </tr> <tr> <td>2</td> <td>heavy</td> <td>light</td> </tr> <tr> <td>3</td> <td>contains marrow</td> <td>no marrow</td> </tr> <tr> <td>4</td> <td>contains calcium salts</td> <td>no calcium salts</td> </tr> <tr> <td>5</td> <td>internal blood vessels</td> <td>no internal / has external blood vessels</td> </tr> <tr> <td>6</td> <td>muscle attached</td> <td>muscle not attached</td> </tr> </tbody> </table>	Difference	Bone	Cartilage	1	rigid/ not flexible	flexible	2	heavy	light	3	contains marrow	no marrow	4	contains calcium salts	no calcium salts	5	internal blood vessels	no internal / has external blood vessels	6	muscle attached	muscle not attached	max (3)
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Question Number	Answer	Mark
1(c)(iii)	<ul style="list-style-type: none"> allows bone / bone shaft to increase in length / grow; Reject stretch 	(1)

Question Number	Answer	Mark
1(c)(iv)	<ul style="list-style-type: none"> rib attachment to sternum; base of sternum; in trachea; ear / pinna; (intervertebral) discs; nose; 	max (2)

(Total 12 marks)

Question Number	Answer	Mark
2(a)(i)	<ul style="list-style-type: none"> inverse relationship / less fibre - more cases of bowel cancer / ORA; 	(1)

Question Number	Answer	Mark
2(a)(ii)	<ul style="list-style-type: none"> 87/88 per 100 000 / range 87-88 per 100 000; 	(1)

Question Number	Answer	Mark
2(a)(iii)	<ul style="list-style-type: none"> 2.50 g; 	(1)

Question Number	Answer	Mark
2(a)(iv)	<p>2.22g gives 93 deaths, 2.50g gives 8- deaths per 100 000;</p> <ul style="list-style-type: none"> (change is) decrease of 13 deaths per 100 000; <p>2 marks for correct answer without working shown</p>	(2)

Question Number	Answer	Mark
2(b)(i)	<ul style="list-style-type: none"> • any leafy vegetable; • root vegetable; • fruits; • all bran / any whole grain cereal; • (wholemeal) bread; • (brown) rice 	max (2)

Question Number	Answer	Mark
2(b)(ii)	<ul style="list-style-type: none"> • increases / aids peristalsis; • prevents constipation / removes faeces easily; • reduces risk of bowel cancer / eq; • less time for toxins to accumulate; 	max (2)

(Total 9 marks)

Question Number	Answer	Mark																														
3	1 mark for each correct answer (x).																															
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(Total 9 Marks)

Question Number	Answer	Mark
4(a)(i)	<ul style="list-style-type: none"> • trachea - P; • bronchi - R; • diaphragm - S; 	(3)

Question Number	Answer	Mark
4(a)(ii)	<ul style="list-style-type: none"> • heart / pericardium; 	(1)

Question Number	Answer	Mark
4(a)(iii)	<ul style="list-style-type: none"> • breathing is movement of air in and out / ventilation of lungs; • respiration is the release of energy (in cells); 	(2)

Question Number	Answer	Mark
4(b)	<ul style="list-style-type: none"> • intercostal muscles contract; • ribs swing up and outwards; • diaphragm (muscles) contracts; • diaphragm less dome shaped / flattened; Rejct moves down • leads to increase in volume of thorax / chest cavity; 	max (4)

Question Number	Answer	Mark
4(c)	<ul style="list-style-type: none"> • particles / pollen / dust / eq; • trapped by mucus; • air warmed; • by radiation / surrounded by tissues at higher temperature; • air moistened; • by evaporation from lining of trachea / mucus; 	max (4)

(Total 14 Marks)

Question Number	Answer	Mark
5(a)(i)	<ul style="list-style-type: none"> • ureter; 	(1)

Question Number	Answer	Mark
5(a)(ii)	<ul style="list-style-type: none"> • urine; Reject urea	(1)

Question Number	Answer	Mark
5(a)(iii)	<ul style="list-style-type: none"> • cortex - filtration / ultra filtration / eq; • medulla - (selective) reabsorption / eq; 	(2)

Question Number	Answer	Mark
5(b)	<ul style="list-style-type: none"> • glucose used by kidney cells for respiration; 	(1)

Question Number	Answer	Mark
5(c)(i)	<ul style="list-style-type: none"> • bulk of water in filtrate reabsorbed; • some solutes reabsorbed; • urea left behind / not reabsorbed; 	max (2)

Question Number	Answer	Mark
5(c)(ii)	<ul style="list-style-type: none"> • all glucose reabsorbed; • from filtrate / kidney tubule into blood; 	(2)

Question Number	Answer	Mark
5(d)(i)	<ul style="list-style-type: none"> • sweating; • less water in the blood; • ref. to ADH; • produced by pituitary; • stimulates nephrons to reabsorb more water; 	max (3)

Question Number	Answer	Mark
5(d)(ii)	<ul style="list-style-type: none"> • it will increase / eq; 	(1)

(Total 13 Marks)

Question Number	Answer	Mark
6(a)(i)	<p>1 mark for correct answer.</p> <ul style="list-style-type: none"> male; <p style="text-align: right;">(1 Mark)</p> <p>1 mark for each correct answer from any of the following - maximum 3 marks</p> <ul style="list-style-type: none"> ref. to unpaired X chromosome in males / male XY; recessive (allele / gene) present in male always shows feature; females can have recessive allele hidden by dominant allele; females must receive a recessive allele from both parents / be homozygous recessive to show feature; <p style="text-align: right;">(3 Marks)</p>	(4)

Question Number	Answer	Mark
6(a)(ii)	<ul style="list-style-type: none"> $X^h Y$; 	(1)

Question Number	Answer	Mark
6(b)(i)	<p>1 mark for each correct answer from any of the following (Accept other logical explanations for these points) - maximum 3 marks.</p> <ul style="list-style-type: none"> haemophilia allele is recessive; Sarah heterozygous / carries recessive X^h; Ian's mother / Catherine inherits X^h from her mother / Sarah / carrier; Ian inherits X^h from his mother / carrier; 	max (3)

Question Number	Answer	Mark
6(b)(ii)	<ul style="list-style-type: none"> Colin is not affected / does not carry X^h / does carry X^H; thus girl cannot have $X^h X^h$ / have two recessive alleles / must have an X^H; 	(2)

(Total 10 Marks)

Question Number	Answer	Mark
7(a)	<ul style="list-style-type: none"> • mother's blood has higher carbon monoxide content than normal; • mother's blood carries reduced amount of oxygen / A/W; • fetus receives reduced / too little oxygen supply; • baby born with reduced birth weight / mass / small; • may show brain damage symptoms; 	max (3)

Question Number	Answer	Mark
7(b)	<ul style="list-style-type: none"> • may cause sunburn / blistering; • can damage skin tissues / cells; • ultra-violet can cause cell / nucleus / chromosome damage; • could lead to (more) mutations; • could lead to skin cancer / melanoma; 	max (4)

Question Number	Answer	Mark
7(c)	<ul style="list-style-type: none"> • loud noise causes large vibrations of eardrum; • this causes large vibrations of middle earbone / malleus; • ligaments to middle ear bone / malleus slackens; • person cannot hear / suffers temporary deafness; • (extensive exposure) can lead to cochlea damage / deafness; 	max (3)

(Total10 Marks)

Question Number	Answer	Mark
8(a)	<p><u>Cerebral hemispheres</u></p> <ul style="list-style-type: none"> controls intelligence / reasoning / learning / controls voluntary muscle / memory / vision / hearing / personality; <p>(1 Mark))</p> <p><u>Cerebellum</u></p> <ul style="list-style-type: none"> balance / involuntary control of skeletal muscles / learned reflexes / named example; <p>(1 Mark)</p>	(2)

Question Number	Answer	Mark
8(b)	<ul style="list-style-type: none"> death; part C controls all involuntary muscles / gut / heartbeat / breathing; 	(2)

Question Number	Answer	Mark
8(c)	<ul style="list-style-type: none"> spinal cord; no impulses below break / lower body; no sensations (below break); paralysis (below break); <p>Reject</p>	max (3)

(Total 7 Marks)

Question Number	Answer	Mark
9(a)	<p>1 mark for each correct answer - maximum 4 marks</p> <pre> graph TD A["Blood vessel cut or damaged"] --> B["platelets;"] B --> C["Soluble prothrombin is changed into thrombin"] C --> D["plasma;"] D --> E["fibrin;"] E --> F["Erythrocytes/ red blood cells"] F --- G["Clot formed"] </pre>	(4)

Question Number	Answer	Mark
9(b)(i)	<ul style="list-style-type: none"> prevents further blood loss; prevents entry of bacteria / pathogens; Reject germs	(2)

Question Number	Answer	Mark
9(b)(ii)	<ul style="list-style-type: none"> clots / thromboses could occur in blood vessels and block them / cause strokes / heart attack / eq; 	(1)

(Total 7 Marks)

Question Number	Answer	Mark
10(a)(i)	<ul style="list-style-type: none"> grinding / crushing / chewing (food); 	(1)
10(a)(ii)	<ul style="list-style-type: none"> molars / (type) A; 	(1)
10(a)(iii)	<ul style="list-style-type: none"> remove all bacteria / food remains / plaque collecting here; 	(1)
10(b)	<ul style="list-style-type: none"> enamel; dentine; calcium; bacteria; acid; erodes / corrodes / dissolves; 	(6)

(Total 9 Marks)