

# Mark Scheme (Results)

## Summer 2010

GCE O

### GCE O Human Biology (7042) Paper 01

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**7042/01 O-LEVEL HUMAN BIOLOGY MARK SCHEME - SUMMER 2010**

Question number	Answer	Reject	Marks
1 (a) (i)	X has no nucleus, Y has a nucleus; X has a regular biconcave shape, Y changes shape irregular; X contains haemoglobin, Y does not contain any haemoglobin; X no granules, Y has granules;  Any two - 1 mark each		2
(ii)	cell X / transports oxygen from lungs to cells / tissues; cell Y / defence against / engulfs pathogens;		2
(b) (i)	correct shape of cell;  cilia labelled; nucleus labelled; cell membrane labelled; cytoplasm;  Any two labels - 1 mark each		1       2
(ii)	cilia (on free surface) beat; force (a current of) mucus to move away from the lungs; bacteria / particles trapped in mucus moved away from the lungs;		3
(c) (i)	cell membrane controls movement of substances; into and out from cytoplasm/cell; Any two - 1 mark each		2
(ii)	nucleus contains genetic material / DNA / genes / chromosomes; this controls formation of structural proteins; formation of enzymes; that control chemical reactions carried out by cell;  Any three - 1 mark each		3

**Total 15 marks**

Question number	Answer	Marks																					
2 (a) (i)	chemicals produced by ductless / endocrine gland; travel in solution in blood / plasma; to / has specific target organs;	2																					
(ii)	when an increase / decrease in the amount of a substance / factor in the body; triggers a mechanism to decrease / increase the amount of the substance / factor;	2																					
(b)	<table border="1"> <thead> <tr> <th>name of hormone</th> <th>hormone released by</th> <th>effect of hormone</th> </tr> </thead> <tbody> <tr> <td><i>A D H</i></td> <td>Pituitary gland / hypothalamus;</td> <td><i>Increases water content of blood</i></td> </tr> <tr> <td>Testosterone;</td> <td>Testes;</td> <td><i>Development of secondary sexual characteristics of males</i></td> </tr> <tr> <td>Adrenalin;</td> <td>Adrenal glands</td> <td><i>Increases heart rate and breathing rate</i></td> </tr> <tr> <td>Insulin</td> <td><i>Pancreas</i></td> <td>Causes conversion of glucose to glycogen;</td> </tr> <tr> <td><i>F S H</i></td> <td><i>Pituitary gland</i></td> <td>Stimulates the maturing of ovum / follicle in ovary;</td> </tr> <tr> <td><i>Oestrogen</i></td> <td>Ovary / developing follicle cells;</td> <td>Increases thickness lining</td> </tr> </tbody> </table>	name of hormone	hormone released by	effect of hormone	<i>A D H</i>	Pituitary gland / hypothalamus;	<i>Increases water content of blood</i>	Testosterone;	Testes;	<i>Development of secondary sexual characteristics of males</i>	Adrenalin;	Adrenal glands	<i>Increases heart rate and breathing rate</i>	Insulin	<i>Pancreas</i>	Causes conversion of glucose to glycogen;	<i>F S H</i>	<i>Pituitary gland</i>	Stimulates the maturing of ovum / follicle in ovary;	<i>Oestrogen</i>	Ovary / developing follicle cells;	Increases thickness lining	7
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Total 11 marks

Question number	Answer	Marks
3 (a) (i)	pH 8.2;	1
(ii)	amino acids;	1
(b) (i)	label line + letter Z to stomach;	1
(ii)	secretion of bile from the liver; secretion of pancreatic juice; both are alkaline contains $\text{NaHCO}_3$ ;  Any two - 1 mark each	2
(c) (i)	absorption of products of digestion;	1
(ii)	large surface area for diffusion; thin epithelium; rich blood / capillary network; for absorption of glucose / amino acids; lacteal / lymph capillary; for transport of fatty acids / glycerol;  Any three - 1 mark each	3
(d)	peristalsis; circular muscles behind food / bolus contract; wave like muscular contractions; push food forwards; muscles in front of food / bolus relax/AW;  Any three - 1 mark each	3

Total 12 marks

Question number	Answer	Marks
4 (a) (i)	X - swing upwards and outwards; Y - becomes flattened / less dome shaped; Rejact moves down	2
	(ii) intercostal <u>and</u> diaphragm muscles contract;	1
	(iii) volume inside thorax increases; R lungs pressure inside thorax / lungs decreases; to below air / atmospheric pressure; difference in pressure forces air into the alveoli/AW;  Any three - 1 mark each	3
	(b) need to get more air into lungs / alveoli; as less oxygen in each breath; pressure difference between internal and external air smaller; need to breathe more frequently; more deeply; intercostal / diaphragm muscles need to work harder; need to maintain steep concentration gradient at alveolar surface / A/W;  Any four - 1 mark each	4

Total 10 marks

Question number	Answer	Marks
5 (a) (i)	A - umbilical cord; B - placenta; C - amnion / amniotic fluid;	3
(ii)	it spreads pressure equally around fetus/shock absorber; less (mechanical) danger from bumps / movements of mother; allows fetus to move around more easily;  Any two - 1 mark each	2
(iii)	the vein; this contains blood returning to fetus from the placenta; blood is oxygenated in placenta;  Any two - 1 mark each	2
(b)	has a large surface area; because of interlocking tissues / placental villi; oxygen; glucose / amino acids / digested foods; in higher concentration in maternal blood; diffuse into fetal blood;  Any four - 1 mark each	4
(c)	progesterone maintains / increases thickness of uterine <u>lining</u> /endometrium; if it fails, uterine <u>lining</u> breaks down; fetus aborted / miscarriage;	3

Total 14 marks

Question number	Answer	Marks
6 (a) (i)	any four points plotted correctly; remaining two points plotted correctly; points joined by straight lines;	3
(ii)	1720 <u>kJ</u> ;	1
(iii)	needs 200 <u>kJ</u> ; less;	2
(b) (i)	as mean daytime temperature falls mean energy demand/intake must increase; ORA	1
(ii)	the greater the difference between body temperature and external temperature/AW; greater the rate of heat loss (to the environment) body temperature must be maintained (for soldiers to remain active); more energy input needed to do this;  Any three - 1 mark each	3

Total 10 marks



Question number	Answer	Marks
7 (a) (i)	a bacterium / Mycobacterium tuberculosis;	1
(ii)	1980;	1
(iii)	1950 - 1955;	1
(iv)	use of vaccines; use of screening techniques / X rays / Mantoux skin test; pasteurisation of milk; Screening/TT of dairy herds; use of antibiotics (reduces risk of cross infection); isolation of patients;  Any two - 1 mark each	2
(b) (i)	a rise / number of cases increasing;	1
(ii)	people less careful to obtain vaccination; resistant forms of TB emerging; immigration of people already infected; ref AIDS and opportunistic infection;	2

Total 8 marks

Question number	Answer	Marks
8 (a)	Skull/cranium; retina; colours; refracted / bent; cornea; ciliary; iris; pupil;	8
(b) (i)	mother; boy inherits X chromosome from mother / only inherits Y chromosome from father/no X chromosome from father/mother is carrier;	2
(ii)	sister - no chance / 0%; brother - 50%/half/one to one ratio;	2

Total 12 marks

Question number	Answer	Marks
9 (a) (i)	left ventricle;	1
(ii)	aorta;	1
(b) (i)	rises by 7.8 <u>dm<sup>3</sup></u> (per minute);	1
(ii)	doubles / increases by 60 beats per minute;	1
(iii)	volume of blood forced from heart; at each ventricular contraction;	2
(iv)	heart rate;  Accept any logical numerical comparison - as energy demand rises from 3.5 kJ per minute to 12.5 kJ per minute heart rate rises by 75 beats per minute but stroke volume stays the same; as cardiac output rises from 12.0 dm <sup>3</sup> per minute to 21 dm <sup>3</sup> per minute the stroke volume stays the same;  Any 1 - 1 mark	1

Total 8 marks

PAPER TOTAL: 100 MARKS



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