

# Mark Scheme (Results)

## Summer 2010

GCE O

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

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our website at [www.edexcel.com](http://www.edexcel.com).

If you have any subject specific questions about the content of this Mark Scheme that require the help of a subject specialist, you may find our **Ask The Expert** email service helpful.

Ask The Expert can be accessed online at the following link:

<http://www.edexcel.com/Aboutus/contact-us/>

Alternately, you can speak directly to a subject specialist at Edexcel on our dedicated Science telephone line: 0844 576 0037

(If you are calling from outside the UK please dial + 44 1204 770 696 and state that you would like to speak to the **Science** subject specialist).

Summer 2010

All the material in this publication is copyright

© Edexcel Ltd 2010

**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
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																					

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; Rector 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 lining/endometrium; if it fails, uterine lining 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;	1
	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;	1
	Any 1 - 1 mark	

Total 8 marks

PAPER TOTAL: 100 MARKS



Further copies of this publication are available from  
International Regional Offices at [www.edexcel.com/international](http://www.edexcel.com/international)

For more information on Edexcel qualifications, please visit [www.edexcel.com](http://www.edexcel.com)  
Alternatively, you can contact Customer Services at [www.edexcel.com/asktheexpert](http://www.edexcel.com/asktheexpert) or on + 44 1204 770 696

Edexcel Limited. Registered in England and Wales no.4496750  
Registered Office: One90 High Holborn, London, WC1V 7BH