UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2012 question paper

for the guidance of teachers

0610 BIOLOGY

0610/32 Paper 3 (Extended Theory), maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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Question	Expected Answers	Marks	Additional Guidance
1 (a)	microvilli ;	[1]	
(b)	water ; glucose ; ions ; amino acids ; vitamins ; oxygen ;	[max 3]	
(c) 1 2 3 4 5	(microvilli) give large surface area ; (large surface area) for diffusion ; (large surface area / mitochondria) for active transport ; ref to, carriers / proteins, (in membranes) ; mitochondria, to provide energy ;	[max 2]	
(d)	small intestine / duodenum / ileum ;	[1]	
		[Total: 7]	

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Question			Expected Answers	Marks	Additional Guidance
2	(a)	1 2 3	increase in size ; (permanent) increase in dry mass ; increase in cell number ;	[max 2]	
	(b)		positive ; phototropism ;	[max 2]	
	(c)	1 2 3 4	tip of shoot is area where stimulus is detected ; response to light is a growth response ; response occurs, **F** / with tip and light ; no response, **E** / whole seedling in darkness / **G** / when tip was covered / **H** / without the tip ;	[max 3]	
	(d)	1 2 3	expose a larger surface area of leaves ; so absorbs **more** light ; so **more** photosynthesis ;	[max 2]	
	(e)	1 2 3 4	auxins stimulate cell **elongation** ; cells have turgor pressure causes cells to lengthen ; more auxins on shaded side ; more, lengthening / growth, on shaded side causes bending ;	[max 2]	
	(f) (i)	1 2 3 4 5	up to 30 minutes no response ; control group showed more, bending / response ; no pigment group, bending increases slowly ; control group, initial lag, increase, levels off, with time ; maximum bending is 73° for control OR maximum bending is 8° for variety with no pigment ;	[max 4]	Units must be stated at least once.
	(ii)	1 2 3	variety without pigment is not able to absorb blue light ; does not detect, (direction of) light ; shows, no / less, bending / response ;	[max 2]	
				[Total: 17]	

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Question	Expected Answers	Marks	Additional Guidance
3 (a)	community **and** the environment / abiotic factors ; interacting / interdependent / in a given area ;	[2]	
(b)	*mammals have* **1** fur ; **2** sweat glands ; **3** pinnae / external ears ; **4** three middle ear bones ; **5** mammary glands / secrete milk ; **6** different types of teeth ;	[max 3]	
(c)	any two suitable suggestions e.g. good sense of hearing / smell / touch refuge / hide during day correct ref. to rods / cones ;;	[max 2]	

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Question	Expected Answers	Marks	Additional Guidance
(d) 1 2 3 4 5 6 7	give some protection for endangered species / prevent extinction ; encourages biodiversity ; maintains (natural) habitats ; encourages genetic diversity ; maintain food, webs / chains ; services that wild places provide ; increasing awareness / education / research ;	[max 4]	
(e)	*ideas of the following required* breed and have fertile offspring ; examine DNA to show that they are similar / have similar genes ;	[max 1]	
		[Total: 12]	

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Question	Expected Answers	Marks	Additional Guidance
4 (a)	**J** – aorta ; **K** – pulmonary vein ; **L** – vena cava ; **M** – pulmonary artery ;	[4]	
(b) (i) 1 **2** **3** **4** **5**	**J** – blood goes to the whole body / greater distance ; **M** – blood goes to the lungs / shorter distance ; **J** – blood is pumped by, more muscular, ventricle ; **M** – blood is pumped by, less muscular, ventricle ; greater resistance to blood flow in circulation to the body / ora ;	[max 2]	
(ii)	(blood in **K** and **L**) travelled through the capillaries ; larger / wider lumen ;	[2]	
(c) **1** **2** **3** **4** **5** **6** **7**	*Valve N* opens when, atrium contracts ; closes when ventricle contracts ; stops back flow from ventricle to atrium ; *Valve O* opens when ventricle contracts ; closes when ventricle relaxes ; stops back flow from, **J**, to ventricle ; description of way in which valve 'flaps' or 'pockets' prevent backflow ;	[max 4]	
(d)	veins ;	[1]	

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Question	Expected Answers	Marks	Additional Guidance
5 (a)	<table><tr><td>Function</td><td>structure</td></tr><tr><td>stores urine</td><td>**A**</td></tr><tr><td>produces gametes</td><td>**F** ;</td></tr><tr><td>produce seminal fluid</td><td>**B / C** ;</td></tr><tr><td>move gametes by peristalsis</td><td>**D / J** ;</td></tr><tr><td>produce testosterone</td><td>**F** ;</td></tr></table>	[4]	
(b) 1 2 3 4 5 6 7 8	flagellum / tail ; motile ; smaller / ref to actual sizes ; acrosome ; no food store ; less cytoplasm ; produced in larger numbers ; contains X <u>or</u> Y (chromosome) ;	[max 4]	

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(c) (i) 1 **2** **3** **4** **5**	(Fertility drugs may contain) FSH / LH ; taken / injected, during early stage of menstrual cycle ; stimulates ovaries ; (FSH) stimulates follicles to develop ; (LH / FSH) stimulates ovulation ;	[max 3]	
(ii) 1 **2** **3**	collect sperm from male / donor ; inject into uterus ; when egg likely to be in oviduct ;	[max 2]	**Accept** through cervix
	[Total: 13]		

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6 (a)

stage	Process
P	nitrogen fixation ;
Q	protein synthesis ;
R	feeding / digestion ;
S	deamination
T	nitrification ;
U	denitrification ;

[5]

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Question	Expected Answers	Marks	Additional Guidance
(b) 1 2 3 4	plants from irradiated seeds had more nodules ; plants from irradiated seeds had nodules with more mass ; comparative data quote for number ; comparative data quote for dry mass of nodules ;	[max 3]	Units are required at least once.
(c)	mutation ; change in, gene(s) / DNA ;	[2]	
(d) 1 2 3 4 5 6 7	choose plants with desired feature(s) ; cross / breed plants ; any detail ; e.g. bagging flowers, transfer of pollen with paintbrush collect seeds ; grow seeds and check plants for features ; cross plants showing features with original variety ; keep crossing and selecting ;	[max 4]	
(e) 1 2 3 4	genetic engineering / genetic modification ; introduced a gene from a **different** species ; results, after one generation ; any detail of method involved e.g. use of vector / plasmid ;	[max 2]	
(f) 1 2 3 4	fix nitrogen ; products of fixation / nitrates provide a source of protein ; increases nitrogen in soil when beans decay ; maintain / higher, yields (of maize) ;	[max 2]	
		[Total: 18]	

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