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

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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 <u>cell</u> 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 <u>and</u> 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^{o} for control OR maximum bending is 8^{o} 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 <u>absorb</u> 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 <u>follicles</u> 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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