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

0610/31 Paper 3 (Extended Theory), maximum raw mark 80

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Question	Expected Answers	Marks
1 (a)		[5]

function	letter
peristalsis	**B**
protein digestion	**C / H / E ;**
insulin production	**D ;**
deamination	**J ;**
partially digested food is mixed with bile	**H ;**
most water is reabsorbed	**E ;**

(b) (i)		[3]

large molecule	nutrients absorbed
protein	amino acids **;**
glycogen	Glucose / $C_6H_{12}O_6$ **;**
fat	fatty acids **and** glycerol **;**

(ii)	calcium / Ca^{2+} **;** iron / Fe^{2+} **;**	[2]
(iii)	vitamins / named vitamin **;**	[1]

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(c)	**MP1** platelets ; **MP2** promote / cause / stimulate, clotting ; **MP3** thrombin / enzyme ; **MP4** (converts) fibrinogen to fibrin ; **MP5** soluble to insoluble / fibrin is insoluble ; **MP6** mesh / network / web, to trap blood (cells) / prevent blood loss ; **MP7** forms scab / hardens ; **MP8** phagocytes, engulf / destroy / AW, bacteria / pathogens ; **MP9** cells divide by mitosis ; **MP10** identical cells ; **MP11** (tissues form to) make / grow, epidermis / capillary / new skin ;	[max 5]
		[Total: 16]
2 (a)	pinna / external ear ; fur ; mammary glands / secretes milk ; sweat glands ; endothermic / homoeothermic / AW ; **A** – warm blooded different types of teeth ; 3 middle ear bones ;	[max 3]
(b)	**MP1** redirects blood away from skin to (internal / vital) organs ; **MP2** vasoconstriction ; **MP3** fat under the skin ; **MP4** fur / hair ; **MP5** traps air ; **MP6** fat / air, poor conductors of heat / insulators ; **MP7** reduces heat loss ; **MP8** by, conduction / convection ; **MP9** generate heat, by metabolism / shivering ; **A** – endothermic **MP10** small surface area to volume ratio / large size ;	[max 5]
(c)	group of organisms of one species ; live in the same place, at the same time / together ;	[2]

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(d)	different species have different, genes / DNA ;	[1]
(e)	any two suitable suggestions, e.g. maintaining, genetic diversity ; important in food web ; possible medical application / useful genes ;	[max 2]
		[Total: 13]
3 (a)	**K** – plumule ; **L** – radicle ; **M** – cotyledon ; **N** – testa ;	[4]
(b)	hypha(e) ;	[1]
(c)	**MP1** substrate, 'fits' into enzyme ; **MP2** active site (of enzyme); **MP3** shape is complementary ; **MP4** substrate is key, enzyme is lock ; **MP5** substrate / starch / nutrient, converted (into products) / AW ; **MP6** (2) products (molecules) leave ; **MP7** enzyme / amylase, can work again on another substrate ;	[max 4]
(d)	very little activity until day 5 ; increase to day 11 / peak at day 11 ; decrease to day 15 ; data quote with day <u>and</u> activity ;	[max 3]
(e)	ref to different shapes of the lines ; (therefore) there is enzyme activity in both pH ; enzyme activity influenced by / specific to, pH ; data quote ; e.g. quote of activity at pH 8 <u>and</u> pH 5 on a specified day ; suggesting one enzyme prefers acid conditions, but by day 15 less enzyme, produced / available ;	[max 3]
		[Total: 15]

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4	(a)	**MP1** attach to virus / bacteria / antigens ; **MP2** prevent movement around the body ; **MP3** prevent entry into <u>cells</u> ; **MP4** stop division ; **MP5** combine with / neutralise, toxins ; **MP6** clump, bacteria / viruses, together ; **MP7** help phagocytes engulf virus / bacteria ;	[max 3]
	(b)	kidney would be rejected ; (lymphocytes produce anti-A) antibodies ; (antibodies) attach to blood vessels ;	[max 2]
	(c)	no, blood / capillaries / antigens / antibodies / white cells / lymphocytes, in the cornea ;	[max 1]
	(d)	$I^AI^O \times I^BI^O$; $I^A\ I^O + I^B\ I^O$; I^OI^O ;	[3]
	(e)		[3]

term	example
a dominant allele	$\mathbf{I^A}$
heterozygous genotype	I^AI^O / I^BI^O / I^AI^B ;
codominant alleles	I^A **and** I^B ;
phenotype	(blood) group, A / B / AB / O ;

	[Total: 12]

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5 (a) (i)

circulatory system	blood vessels that carry oxygenated blood
maternal	V ;
fetal	Y / Y **and** X ;

[2]

(ii) umbilical cord ;
Any one of the following:

tied / clamped ;
cut ;
(part attached to mother) comes away with placenta ;
(part attached to baby) drops off ;

[2]

(iii) **MP1** oxygen, from maternal / to fetal ;
MP2 carbon dioxide, from fetal / to maternal ;
MP3 named nutrients from maternal / to fetal ;
MP4 water, either direction or both ;
MP5 antibodies, from maternal / to fetal ;
MP6 urea / nitrogenous waste, from fetal / to maternal ;
MP7 passage of hormones, from maternal / to fetal / both directions ;
MP8 diffusion in correct context ;
MP9 active transport in correct context ; (amino acids)

[max 4]

(b) *oestrogen and progesterone*

MP1 develops, (lining of) uterus / endometrium ;
MP2 prevent, shedding of lining / menstruation ;
MP3 inhibit (release of) FSH ;
MP4 by pituitary gland ;
MP5 prevent egg cells / follicles, developing (in ovary) / ovulation ;
MP6 promote development / growth, of mammary glands ;

[max 3]

[Total: 11]

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6	(a)	**MP1** reduction of (wild) habitat / change the ecosystem ; **MP2** area too small to support many organisms ; **MP3** populations, are too small / isolated, to survive / breed; **MP4** disruption to food chain / food web ; **MP5** flooding ; **MP6** erosion ; **MP7** leaching of minerals ;	[max 3]
	(b)	**MP1** more energy available ; **MP2** energy loss, within / between, trophic levels ; **MP3** energy lost in animal's, metabolism / respiration / movement / excretion ; **MP4** little energy for animal growth ; **MP5** (about) 90% loss / (only) 10% passed on to humans ;	[max 3]
	(c)	**MP1** burning trees gives off carbon dioxide ; **MP2** less photosynthesis ; **MP3** so less carbon dioxide, absorbed ; **MP4** less oxygen produced ; **MP5** cows give off, methane ; **MP6** methane, greenhouse gas ; **MP7** traps heat in the atmosphere ; **MP8** less transpiration ; **MP9** reduced rainfall ;	[max 3]
	(d)	soils, are thin / have little humus content ; no / less, recycling organic material ; competition for minerals from crop ; constant cultivation, removes / overuses, minerals ; plant pest population increases ;	[max 2]
	(e)	less, forest cleared ; less energy used ; less water used in paper production from recycled paper ; less waste to, landfill ; less rubbish burnt, so less carbon dioxide given off ;	[max 2]
			[Total: 13]

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