CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2014 series

0610 BIOLOGY

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

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	Answer	Marks	Guidance for Examiners
1 (a)	**V** – lag (phase) ; **W** – log phase / exponential (phase) ; **X** – stationary / plateau (phase) ;	[3]	
(b)	temperature ; pH ; oxygen concentration ; consistency / turbidity / density ;	max [2]	
(c)	*(Penicillium)* has no (individual) cells / has hyphae ; measuring mass is easier (compared with counting) ; measuring mass is more accurate / valid (compared with counting) ;	max [1]	
		[Total:6]	
2 (a) (i)	**A** – oviduct ; **B** – ovulation ; **C** – zygote ;	[3]	
(ii)	follicle stimulating hormone / FSH ; luteinising hormone / LH ;	[2]	
(iii)	**1** flagellum / 'tail', for swimming / movement ; **2** small / streamlined shape, for (efficient) swimming ; **3** mitochondria, for providing energy ; **4** acrosome / (packet of) enzymes, for digestion of (follicle) cells / to reach ovum ; **5** haploid nucleus to fuse with egg (nucleus) ; **6** nucleus, to transfer genetic information to zygote ;	max [3]	**R** produce / create / forms energy AW ,

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(b)	**1** maintain / increase, population ; **2** allows variation ; **3** (variation) caused by meiosis ; **4** for example through crossing over / independent assortment ; **5** random fusion of gametes ; **6** ability to express recessive traits / AW ; **7** adaptation to new / changed environments ; **8** (allows) natural selection / evolution / formation of new species ;	max [5]	
		[Total:13]	
3 (a)	**1** diffusion / osmosis / move, from cell (to air space) ; **2** (water moves) through cell wall / membrane ; **3** evaporates into the air spaces (inside the leaf) ; **4** water vapour moves out through the stomata ; **5** (vapour) diffuses (through stomata) ; **6** transpiration ;	max [4]	
(b)	**1** water moves through the xylem ; **2** transpiration pull ; **3** water column under tension / negative / less, pressure (in leaves) ; **4** cohesive forces between water molecules ; **5** lowers water potential / water potential gradient from root to leaves ; **6** adhesive forces between water molecules and xylem (wall) ;	max [4]	**Ignore** water concentration
(c)	**1** osmosis ; **2** down a water potential gradient ; **3** into the root hairs ; **4** through a partially permeable membrane ;	max [3]	**Ignore** water concentration

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(d)	**1** filtration / screening to remove large pieces of waste ; **2** flocculation / coagulation to separate suspended particles from water / sedimentation to settle particles ; **3** digestion by, bacteria / fungi / decomposers / microorganisms ; **4** with aeration (tank) / trickle filter / activated sludge ; **5** sludge treated with anaerobic decomposers / anaerobic digestion ; **6** (water) treated with, chlorine / ozone / UV (light) ; **7** distillation / collection of water from evaporator ;	max [3]	
(e)	**1** kill other plants that are not weeds ; **2** harms, insect / animals ; **3** bioaccumulation / AW ; **4** loss of biodiversity / destroy habitat ; **5** run off into, streams / rivers / lakes ; **6** selects for herbicide, resistance / tolerance ; **7** weeds become more difficult to control / AW ;	max [3]	
		[Total:17]	
4 (a) (i)	urea / hydrogencarbonate (ions) ;	[1]	Mark first response on each line **A** lactic acid
(ii)	fibrinogen / insulin ;	[1]	Mark first response on each line
(b) (i)	anaerobic respiration ; oxygen debt / vigorous exercise with insufficient oxygen supply ;	[max 1]	
(ii)	(blood) clotting ; converted into fibrin to form a mesh ;	[1]	

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(iii)	*any two from* dilation of pupils ; reduced blood flow through, digestive system / skin ; increase in, blood pressure or heart rate / pulse / stroke volume ; increase in breathing rate; increase in oxygen concentration in the blood ; increase in glycogen converted to glucose ; increase in glucose / sugar concentration in the blood ; increase in respiration rate ; increase in blood flow through the muscles ; increase in awareness / anxiety / alertness ; broncho-dilation / widen airways ;	max [2]	
(c)	**1** (liver cells respond) to insulin if blood glucose is high ; **2** (enzymes / liver cells) conversion of glucose to glycogen ; **3** glycogen is stored (in the liver) ; **4** (liver cells respond) to glucagon if blood glucose is low ; **5** (enzymes) break down glycogen to glucose ; **6** ref to, homeostasis / negative feedback ;	max [3]	**Reject** reference of insulin / glucagon production in liver
(d) (i)	$\frac{3500-1300}{1300}\times 100$ 169 (%) ;;	[2]	
(ii)	**1** nonspecific immune response ; **2** engulf / ingest / A W, bacteria / pathogens / dead cells ; **A** phagocytosis **3** into vacuole ; **4** use enzymes ; **5** to digest bacteria / pathogens ; **6** identify antigen / pathogens, for lymphocytes ;	max [3]	**Reject** destroy disease

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(iii)	**1** recognition tissue is foreign / AW ; **2** ref to antigens ; **3** lymphocytes release antibodies ; **4** phagocytes / lymphocytes, cause tissue destruction ;	max [3]	
		[Total: 17]	
5 (a)	**1** peristalsis ; **2** circular muscles contract (to push to food) ; **3** muscle contraction above food pushes it forward ; **4** circular and longitudinal muscles work antagonistically / AW ;	max [2]	
(b) (i)	**P** – epithelium / epithelial cell ; **Q** – (blood) capillary ; **R** – lacteal / lymphatic vessel ;	[3]	**Reject** ciliated epithelium, epidermis, goblet cell **Accept** epithelium with brush border
(ii)	hepatic portal (vein) ;	[1]	
(iii)	give a large surface area (of membrane) ; to increase / maximise, absorption ; by diffusion / by active transport ;	max [2]	
(iv)	enzymes / proteases / lipases ; (stomach) acid ; physical damage / AW ; parasites / (named) pathogens / toxins ;	max [2]	
		[Total:10]	

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6 (a)	**1** antennae ; **2** elongated bodies ; **3** segmented body / many segments ; **4** many (⩾10) legs ; **5** (one or two pairs of) legs on each segment ; **6** exoskeleton ; **7** jointed legs ;	max [3]	
(b)	**1** length of antennae ; **2** number of sections on antennae ; **3** presence / absence, of tail pieces / AW ; **4** length of tail pieces ; **5** length of legs ; **6** number of leg joints ; **7** total number of legs ; **8** position of legs on body ; **9** number of legs per segment ; **10** size / shape of segments ; **11** number of body segments ; **12** length of body ; **13** head shape ; **14** presence / absence 'spots / markings' ;	max [3]	

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(c) (i)	nucleus **;**	[1]	**Ignore** chromosomes
(ii)	**1** *idea that* animals are identified accurately **; R** identify unqualified **2** barcoding is, cheap / easy / quick / efficient **;** **3** barcoding is useful if distinguishing characteristics / dichotomous key are difficult **;** **4** identify previously unknown species **;** **5** helps to identify, threatened / endangered species **;**	max [2]	
(iii)	**1** ref to genes **;** **2** codes for (specific) proteins **;** **3** stores genetic information **;** **4** can be copied to pass on information to new cells **;**	max [2]	
(d) (i)	**1** all arrows point from food to feeder **;** **2** millipedes eat dead leaves and fungi **;** **3** food chain : bacteria → nematodes → springtails → centipedes **;** **4** centipedes eat millipedes, springtails and earthworms **;**	[4]	
(ii)	**1** ref to, respiration / decomposition **;** **2** release carbon dioxide **;** **3** carbon dioxide is taken in by, plants / photosynthesis **;**	max [2]	
		[Total:17]	

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