GradeMax

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Cambridge International General Certificate of Secondary Education

MARK SCHEME for the May/June 2015 series

0610 BIOLOGY

0610/33 Paper 3 (Extended Theory), maximum raw mark 80

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Abbreviations used in the Mark Scheme

- **;** separates marking points
- / separates alternatives within a marking point
- **R** reject
- **ignore** mark as if this material was not present
- **A** accept (a less than ideal answer which should be marked correct)
- AW alternative wording (accept other ways of expressing the same idea)
- underline words underlined (or grammatical variants of them) must be present
- max indicates the maximum number of marks that can be awarded
- mark independently the second mark may be given even if the first mark is wrong
- ecf credit a correct statement that follows a previous wrong response
- ( ) the word / phrase in brackets is not required, but sets the context
- **ora** or reverse argument
- AVP any valid point

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Question	Expected Answers	Marks	Additional Guidance
1 (a) (i)	go to 2 go to 5 *Gymnopis multiplicata* **B** go to 3 *Triturus cristatus* **C** go to 4 *Necturus maculosus* **D** *Ambystoma tigrinum* **G** go to 6 *Oreophrynella quelchii* **E** *Polypedates leucomystax* **F** *Rana temporaria* **A**	[max 3]	5 / 6 right = 3 3 /4 right = 2 1 /2 right = 1 0 right = 0
(b)	**1** habitat, destruction / change **;** **A** examples of destruction, e.g. deforestation, soil erosion **2** (named) pollution **;** **A** global warming / climate change / acid rain **3** (fungal) disease **;** **4** hunting (for pet trade / food) **;** **5** lack of food / starvation **;** **ignore** competition for food **6** competition, with alien / introduced / exotic, species **;** **7** predation by introduced species **;** **8** roadkill **;** **9** AVP **;**	[max 3]	
	Total:	**[6]**	

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Question	Expected Answers	Marks	Additional Guidance
2 (a) (i)	passive / does not require energy ; substances move down a concentration gradient ; does not have to occur across a membrane ; occurs with gases ; no need for protein, carrier / channels / pumps ;	[max 2]	
(ii)	root hair (cells) ; through carrier molecules / AW ; large / increased, (surface) area (for absorption) ; roots grow continually (to find new sources of ions) ; AVP ; e.g. extensive root network / branching roots ;	[max 2]	
(b) (i)	*two marks for the correct answer – if no answer, an incorrect answer or an answer without the minus sign award one mark for the correct working* 183 – 175 = 8 ; $\frac{8}{183} \times 100 = -4.4$;	[2]	**A** – 4.37
(ii)	start mass of the onions is, different / not all the same ; (idea that) allows for (valid / fair) comparison ; to determine water potential of the onion ;	[max 2]	
(c) (i)	line finished to - 4.4 / **A** ecf from (b)(i) ;	[1]	**R** extrapolation past 200 g dm^{-3}
(ii)	44 ± 1 ; g dm^{-3} ;	[2]	

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Question	Expected Answers	Marks	Additional Guidance
(d)	**1** movement of water **;** **2** by osmosis **;** **3** through partially permeable membrane(s) **;** **4** *gain* – onion has lower water potential / solution has higher water **5** potential **;** *loss* – onion has higher water potential / solution has lower water potential **;**	[max 4]	**A** 'down a water potential gradient' if direction is correct and clear **ignore** references to 'concentrations of water'
3 (a)	**1** carbon dioxide uptake of **J** is higher (at all temperatures except at 10 °C) **;** **2** peak / optimum / maximum / best, uptake of **J** is at a higher temperature **ora ;** **3** data recorded in **J** between 35 – 40 °C / AW (but not for **H**) **;** **4** correct use of comparative data between **J** and **H** with correct units **;**	[max 3]	**A** peak uptake for **J** is higher than **H** correct units must be stated at least once
(b) (i)	**1** temperature is a limiting factor **;** **2** increases, (kinetic / heat) energy / the movement of molecules / diffusion **;** **3** more collisions between substrate and enzymes **;** **4** to speed up chemical reactions **;** **5** stomata open wider **;** **6** therefore increased carbon dioxide entering the leaf / AW **;**	[max 2]	
(ii)	**1** enzymes are denatured **;** **2** enzymes are no longer active / AW **;** **3** stomata close **;** **4** therefore reduced carbon dioxide entering the leaf / AW **;**	[max 2]	

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Question	Expected Answers	Marks	Additional Guidance
(c)	**1** plant growth is likely to increase **;** **2** higher rate of photosynthesis **;** **3** means more glucose / starch, is produced **;** **4** glucose is used for respiration to provide energy (for growth) **;** **5** more cellulose for cell walls **;** **6** more protein for, enzymes / cell membranes **;** **7** other limiting factors / CO_2 no longer limiting **;** **8** carbon dioxide is a greenhouse gas / reference to (enhanced) greenhouse effect **;** **9** increase in global temperatures increases rate of photosynthesis **;** **10** reference to effect of temperature on enzymes **;** **11** any relevant consequence of global warming **;** **12** AVP **;** e.g. relevant use of data	[max 5]	'more' need only stated once **A** 'global warming'
4 (a) (i)	**1** removal from the, body / organism / cell **;** **2** (of) poisons / toxins / harmful substances **;** **3** named example (or) waste products of, metabolism / respiration / deamination / chemical reactions in cells **;** **4** substances in excess (of requirements) / AW **;**	[max 3]	
(ii)	carbon dioxide / water (vapour) **;**	[1]	
(iii)	**1** deamination (of amino acids) **;** **2** removal of nitrogen-containing part of amino acids **;** **3** to produce urea **;** **4** urea / AW, passes into blood **;** **5** breakdown of, hormones / toxins / drugs / excess vitamins **;** **6** breakdown of, worn out red blood cells **;** **7** excretory products put in bile **;** e.g. cholesterol	[max 3]	

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Question	Expected Answers	Marks	Additional Guidance
(b)	<table><tr><th>Function</th><th>Name</th><th>letter from Fig.4.1</th></tr><tr><td>blood is filtered</td><td>cortex</td><td>**K ;**</td></tr><tr><td>concentration of urine is determined</td><td>medulla</td><td>**L**</td></tr><tr><td>urine flows to the bladder</td><td>ureter</td><td>**N ;**</td></tr><tr><td>blood is carried into the kidney</td><td>renal artery</td><td>**P ;**</td></tr><tr><td>blood flows out of the kidney</td><td>renal vein</td><td>**O ;**</td></tr></table>	[4]	one mark for each correct name and matching letter
(c) (i)	urea **;** ammonia **;** uric acid **;** creatinine **;** (named) salt / ions **;** e.g. Na^+, Cl^-, Mg^{2+}, Ca^{2+}, HCO_3^- water **;** (named) toxins **;** hormones **;**	[max 2]	**ignore** glucose / sugar / urine / amino acids
(ii)	*advantage* **1** patients do not need to return to clinic for dialysis / AW **;** **2** can eat normally / do not need to eat a restricted diet / AW **;** **3** periods of feeling unwell reduced / absent **;** *disadvantage* **4** need, immunosuppressant / AW, drugs **;** **5** risk of death / infection, during / after, the operation **;** **6** rejection of kidney **;** **7** finding a compatible donor **;** **8** AVP **;** e.g. water retention	[max 2]	one mark for an advantage and one mark for a disadvantage
	Total:	**[15]**	

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Question	Expected Answers	Marks	Additional Guidance
5 (a) (i)	**R** – corpus luteum / yellow body ; **S** – (Graafian) follicle ;	[2]	
(ii)	ovulation ;	[1]	
(b) (i)	(o)estrogen ;	[1]	
(ii)	progesterone ;	[1]	
(c) (i)	**1** flagellum / tail / streamlined ; **2** motile / swim / AW ; **3** smaller / reference to actual sizes ; **4** acrosome / enzymes in packet on head ; **5** no food store ; **6** less cytoplasm ; **7** contains X or Y (chromosome) ; **8** AVP ;	[max 3]	**A** contains Y chromosome
(ii)	haploid ;	[1]	
(iii)	oviduct ;	[1]	**A** fallopian tube
(iv)	**1** (acrosome) enzymes break down, jelly layer / AW ; **2** sperm, head / nucleus, enters egg ; **3** fertilisation membrane forms / no more sperm can enter ; **4** (haploid) nuclei, fuse / join ; **5** (diploid) zygote formed ; **6** mitosis / cell division ; **7** (2 / more – celled) embryo forms ; **8** (hollow) ball of cells / embryo / zygote / fertilised egg, moves down the oviduct ; **9** ciliary movement / peristalsis, in the oviduct ;	[max 4]	

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Question	Expected Answers	Marks	Additional Guidance
(d) (i)	**1** no / slight, change, at first / AW ; **2** then exponential / AW, increase ; **3** then levels off / peaks (after 1992) ; **4** comparative use of figures with correct units stated at least once ;	[max 2]	
(d) (ii)	**1** provide (named) fertility drug early in menstrual cycle ; e.g. when follicle(s) are developing / 14 days before AI **2** collect, sperm / semen (from male) ; **3** place, semen / sperm, into uterus / vagina / through cervix ; **4** around the time of ovulation ;	[max 3]	
	Total:	**[19]**	
6 (a) (i)	autotrophic (organism) ; organism that makes its own organic nutrients / food ; (usually) using energy from the Sun / by photosynthesis ;	[2]	
(ii)	**1** all arrows point from food to feeder ; **2** elephant grass added (at the producer level) ; **3** phytoplankton and elephant grass arrows go to fish ; **4** mulberry trees arrow goes to silkworms ; **5** vegetables and fish arrows go to humans ;	[5]	
(b)	**1** not all of the plants are edible / some not digested ; **2** faeces / egestion ; **3** eaten by, pests / AW ; **4** dead leaves / AW, to decomposers ; **5** plants lose energy as a result of respiration ; AVP ; e.g. some energy not used for growth	[max 3]	

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Question	Expected Answers	Marks	Additional Guidance
(c)	**1** (another) source of income **;** **2** provides source of, protein / vitamins **;** **3** feed on waste materials / elephant grass cuttings / phytoplankton (from the dykes) **;** **4** so do not need feed bought in / no waste removal required **;** **5** makes use of large quantities of available (delta) water **;** **6** AVP **;** e.g. constant source of water (for irrigation) / reduced risk of eutrophication / biological control / less need for dredging	[max 3]	
	Total:	**[13]**	

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