CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2012 series

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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Question		Expected Answers	Marks	Additional Guidance
1	(a)	**(i)** mycelium **;**	[1]	
		(ii) hypha **;**	[1]	
	(b)	hyphae, secrete / release **;** enzymes **;** amylase **;** breaks down starch to, maltose / glucose **;** protease **;** breaks down protein to, peptides / amino acids **;** products absorbed **;** by diffusion / active uptake **;**	[max 4]	**ignore** produce **accept** soluble nutrients if no digestion given

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	(c)	**(i)** antibiotics diffuse through the agar **;** (some) kill / stop reproduction of, bacteria ref to not all antibiotics being effective	[max 2]	
		(ii) bacteria grew around the discs **;** bacteria are <u>resistant</u> to antibiotics 1 and 5 **;** any explanation of resistance **;**	[max 2]	**R** immune bacteria break down antibiotic
		(iii) kill all the bacteria **;** some still present even after person feels better **;** prevents bacteria becoming resistant **;** prevents selection of resistant strain **;**	[max 2]	**accept** description of selection even if the term is not used
			[Total: 12]	

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Question		Expected Answers	Marks	Additional Guidance
2	(a)	**A** – pancreas ; **B** – insulin ; **C** – glucagon ;	[3]	**A** Islet(s) of Langerhans *although not an organ*
	(b)	**(i)** liver ;	[1]	
	(ii)	glycogen less reactive than glucose ; *idea that* is not lost from cell by diffusion ; not used up in respiration ; decreases concentration of solute(s) ; *idea that* this prevents a decrease in water potential ; so reducing excess uptake of water ; by osmosis ; prevents cell bursting (as a result of osmosis) ;	[max 2]	
	(c)	negative feedback ;	[1]	
	(d) (i)	gene identified / location found ; cut from, DNA / chromosome ; inserted into, plasmid / vector ; plasmid inserted into bacterium ; AVP ;	[max 3]	restriction enzymes / ligases

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	(ii)	*advantages for max 2* increases, yield / production **;** increases profits **;** fewer animals need to be kept **;** less waste / less pollution **;** *disadvantages to max 2* puts health of animals at risk **;** consumers may not buy 'genetically modified food' **;** ref to health scares with hormonally-treated animals **;** ref to health scares with use of GM products **;** AVP **;** e.g. ref to milk surpluses	[max 3]	e.g. mastitis **A** GM
			[Total: 13]	

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Question		Expected Answers	Marks	Additional Guidance
3	(a)	loss of water vapour ; from, leaves / stems / aerial parts / through stomata ;	[2]	**accept** evaporation **accept** diffusion through stomata
	(b)	water moves from high(er) water potential to low(er) water potential ; by osmosis ; through partially permeable membrane ; ref to protein pores ;	[max 3]	
	(c)	*feature plus explanation* no leaves ; less surface for / reduce, transpiration / loss of water ; swollen / AW, stem ; stores water ; spines ; protect against, herbivores / being eaten ; ridged stem ; allows stem to swell when water available ; upright shape ; reduce surface area for absorption of heat (at mid day)	[2 + 2]	*a mark can be awarded if the feature is not linked to an explanation or the explanation is incomplete or incorrect* *each explanation must be linked to a feature, no mark for an explanation alone*

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	(d)	*allowing to survive* no / less, water (vapour) lost ; by transpiration / diffusion ; can survive, in dry areas / with shortage of water from the soil / with little rainfall ; open at night when cool without much loss of water ; *limits growth* cannot absorb carbon dioxide during the day ; carbon dioxide diffuses through stomata ; needed / raw material, for photosynthesis ; only happens when light available ; therefore little food (for growth) ; transpiration cools plants ; may overheat (during the day) ; ref to denaturation of, proteins / enzymes ; slower, reactions / metabolism / AW ; AVP ;	[max 4]	
			[Total: 13]	

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Question		Expected Answers	Marks	Additional Guidance
4	(a)	*substance that* speeds up a chemical reaction ; not changed during the reaction ;	[2]	
	(b)	**(i)** *ideas that* temperature is not a variable being investigated ; temperature is a factor that affects enzyme action ; 30 °C, optimum temperature / enzymes work best ;	[max 2]	**A** temperature is a control variable
		(ii) as control(s) ; *tube 5* to show that urea does not breakdown without enzymes ; *tube 6* to show that beans are not source of pH change ;	[max 2]	
		(iii) soya and jack beans have urease ; mung and broad beans have no urease ; mung and broad beans may have low concentration of urease ; jack beans have more urease than soya beans ;	[max 3]	**A** more active

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	(c)	converted to, nitrite (ions) / nitrate (ions) **;** by nitrifying bacteria **;** absorbed by plants **;** vapourises **;** donates hydrogen ions **;** (hydrogen ions from ammonium ions) reacts with lime in neutralised (in this context only) **;**	[max 2]	
	(d)	**(i)** (gastric juice contains) hydrochloric acid **;** low pH **;** kills bacteria / stops them dividing **;** AVP **;**	[max 2]	
		(ii) urease produces ammonia **;** neutralises, stomach acid / hydrochloric acid **;**	[2]	
		(iii) *lymphocytes secrete* antibodies **;** phagocytes engulf bacteria **;**	[2]	
			[Total: 17]	

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Question		Expected Answers	Marks	Additional Guidance
5	(a)	little / very little, increase up to 1850 all have increases ; coal from around 1850 ; petroleum from 1920 / gas from late 1940s ; coal reached a peak in 1990s ; coal only one showing decrease ; oil decreased in 1970s ; steep increase in use from 1950s ; comparative data quotes ;;	[max 5]	
	(b)	*hydrocarbons to max 3* produce carbon dioxide ; greenhouse gas ; carbonic acid / acid rain ; smoke / particles ; *compounds of sulfur* produce sulfur dioxide ; sulfuric acid / acid rain ;	[max 4]	**allow** acid rain once in answer

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	(c)	fossil fuels are, non-renewable / AW **;** conserve for future generations **;** more efficient ways of using them in the future **;** alternatives are, expensive / not reliable **;** AVP **;**	[max 2]	
			[Total: 11]	

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Question		Expected Answers	Marks	Additional Guidance
6	(a)	(gives) variation / diversity ; **R** 'varied species' (plural) ref to, alleles / genes / DNA, from different, plants / *idea that* increased chance for mutations to be expressed ; allows adaptation to, new conditions / changed environment / AW ; allows evolution to occur ; prevents inbreeding ; ref to disease resistance ;	[max 3]	
	(b)	**(i)** **A** – ovary / ovary wall ; **R** pod **B** – pollen tube ; **C** – zygote ; **D** – radicle / embryonic root ; **E** – cotyledon / seed leaf ;	[5]	**accept** embryo once only for **D** or **E**
		(ii) <u>mitosis</u> ;	[1]	
	(c)	(male / female) gametes are not all identical ; female gametes are not fertilised by identical male nuclei ; gametes are produced by meiosis ; meiosis gives rise to variation ; pollen grains come from different plants ;	[max 2]	

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	(d)	some seeds not, viable / AW **;** some remain dormant **;** no water available **;** no soil **;** no minerals / no nutrients **;** too cold / too hot **;** **A** extremes of temperature not enough light **;** ref to competition with other plants **;** eaten by animals **;**	[max 3]	
			[Total: 14]	

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