OCR
RECOGNISING ACHIEVEMENT

GCSE

Additional Science B

General Certificate of Secondary Education

Unit **B623/02:** Modules B3, C3, P3

Mark Scheme for June 2011

Oxford Cambridge and RSA Examinations

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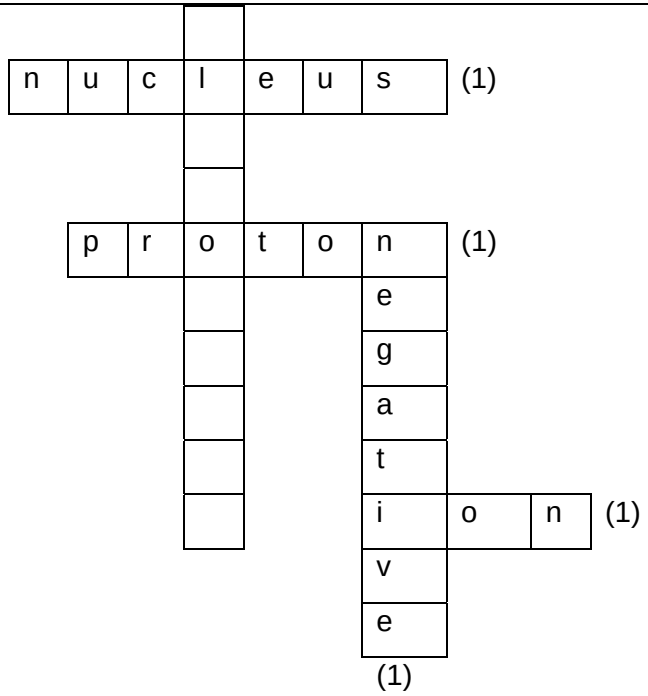
Question			Expected Answers	Marks	Additional Guidance
1	a	i	0 (to) 3 (1)	1	both answers needed for 1 mark
		ii	21(to) 24 (1)	1	both answers needed for 1 mark
	b		indication of growth / indication of health / health problems indication of development (1)	1	**allow** specific examples: abnormal growth hormone / deficiency disease / low mass gain may indicate problem in digestive system / obesity
	c	i	mitosis (1)	1	**allow** phonetic spelling
		ii	haploid diploid diploid haploid (1)	1	all correct for 1 mark more than 4 ticks (0)
			Total	**5**	

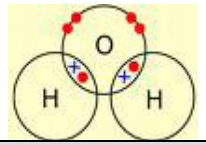
Question			Expected Answers	Marks	Additional Guidance
2	a	i	55 (^{o}C) (1)	1	**allow** answer in range 54-56
		ii	**max three from:** amylase / it / enzyme is denatured (1) BUT amylase / it / enzyme is partially denatured (2) amylase / it / enzyme changes shape (1) BUT active site changes shape (2) bonds broken (1) increased k.e. (1)	3	 begins / starts to denature = 2 **ignore** enzyme breaks down
	b	i	diffusion (1)	1	**allow** active transport **not** osmosis **allow** correct definitions of the processes
		ii	(starch molecules) are big / large / glucose (molecules) are small / starch is insoluble / glucose is soluble (1)	1	**ignore** thick **ignore** reference to time without mention of size
	c		**any two from:** large surface area / villi / microvilli / folding (1) long (1) permeable (surface / wall) (1) thin wall (1) good blood supply / concentration gradient (1)	2	 **not** permeable cell wall **not** thin cell wall **ignore** thin unless qualified
	d		<u>plasma</u> (1)	1	
			Total	**9**	

Question			Expected Answers	Marks	Additional Guidance
3	a	i	breeding (closely) related animals (1)	1	**allow** examples eg brother and sister / cousins / within the family / same blood lines
		ii	combining of harmful recessive alleles/ reduction in variation / smaller gene pool (1)	1	**allow** increased chance / more genetic disorders / more recessive characteristics / causes genetic disorders **not** increased mutation
	b	i	split the embryo (1)	1	**allow** clone the embryos / divide the cells / separate the embryo / separate the cells **ignore** multiply the embryo
		ii	can produce many offspring / embryo (1)	1	**allow** can freeze embryos / can transport the embryos
	c	i	nucleus from mammoth cell is put in an enucleated elephant egg cell (1)	1	**allow** empty egg cell
		ii	no nucleus / no DNA / no genes / no genetic information (1)	1	
			Total	6	

Question			Expected Answers	Marks	Additional Guidance
4	a		Ar (1)	1	**allow** argon **ignore** ar / AR
	b		I (1)	1	**allow** iodine **ignore** iodide **ignore** i
	c		F (1)	1	**allow** fluorine **ignore** fluoride **ignore** f
			Total	**3**	

Question			Expected Answers	Marks	Additional Guidance
5	a	i	(iron is) a poor electrical conductor (1)	1	**allow** because of its electrical conductivity **not** references to high density / high melting point **ignore** poor conductor unless qualified by electrical **ignore** poor thermal conductor
		ii	(aluminium has) a low(er) density (than copper) (1)	1	**ignore** references to electrical conductivity **not** references to melting point / thermal conductivity **ignore** weighs less / lighter
	b	i	(conduct electricity) with little / no / very small resistance (1)	1	**ignore** conducts electricity very well
		ii	**only** work at (very) low temperatures / needs low temperatures (1)	1	**ignore** difficult to make **ignore** reference to cost **allow** example temperatures less than -100^0C
			Total	**4**	

Question	Expected Answers	Marks	Additional Guidance
6	 (1) (1) (1) (1)	4	answers on crossword take precedence **allow** answers in clues if answer not in crossword **allow** incorrect spelling 2 across – nucleus (1) 3 across – proton (1) 5 across – ion (1) 4 down – negative (1)
	Total	**4**	

Question			Expected Answers	Marks	Additional Guidance
7	a		oxygen formed at the anode / positive electrode **and** aluminium formed at the cathode / negative electrode (1) (cryolite) reduces the melting point of it / aluminium oxide / to dissolve aluminium oxide (1) (extraction of aluminium is expensive because it) uses a lot of electricity / anodes need replacing (1)	3	**ignore** moves to or is attracted to the electrodes **allow** to reduce the (operating) temperature needed **ignore** reduces the temperature **ignore** reduces the melting point if not clear that it refers to aluminium oxide / reduces the melting point of aluminium **not** it is a catalyst **allow** uses a lot of energy **ignore** just uses electricity **ignore** expensive equipment
	b		$4OH^- - 4e^- \rightarrow O_2 + 2H_2O$ formulae (1) balancing (1) **allow** $4OH^- \rightarrow O_2 + 2H_2O + 4e^-$ (2)	2	**allow** = instead of → **allow** e / E for e^- **allow** correct multiples **not** and / & instead of + $4OH^- + 4e^- \rightarrow O_2 + 2H_2O$ = 0 marks balancing mark is dependent on correct formulae allow 1 mark for a balanced equation with a minor error in subscripts / formulae eg $4OH^- - 4e^- \rightarrow O2 + 2H_2O$
	c		at least one pair of shared electrons between hydrogen and oxygen (1) rest of diagram correct (1)	2	**ignore** inner shell of electrons for oxygen **allow** diagrams using all dots or all crosses circles need not be drawn 
			Total	**7**	

Question			Expected Answers	Marks	Additional Guidance
8	a		hydrogen (1)	1	**allow** H_2 / H / H^2 / H2 **not** h_2 / h / h^2 / h2
	b		(potassium) loses electrons more easily (1)	1	**not** (potassium) loses electrons faster **ignore** potassium is further down the group **allow** higher level answers referring to greater distance of (outer) electron from nucleus / weaker force between outer electron and nucleus / more shielding eg outer electron in potassium is a long way from the nucleus scores 1
			Total	**2**	

Question			Expected Answers	Marks	Additional Guidance
9	a	i	D (1)	1	if answer line is blank **allow** correct answer ticked circled or underlined **allow** weight is greater than drag
		ii	B (1)	1	if answer line is blank **allow** correct answer ticked circled or underlined **allow** drag increases
		iii	weight = drag (1)	1	**allow** gravity for weight and friction or air resistance for drag **ignore** upthrust **allow** forces are balanced / equal (and opposite) / there is no resultant force
	b		long**er** / great**er** AW (1) low**er** / slow**er** / less / decreased AW (1)	2	**ignore** different / slower answers must be comparative
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
10	a	i	300 (2) **but** if answer is incorrect ½ or 0.5 x 12 x 50 (1)	2	**ignore** statements such as area under the graph and ave. speed x time **allow** 6 x 50 or 12 x 25 for working mark if answer is incorrect
		ii	constant speed / AW (1)	1	**allow** steady speed ***/*** same speed / not accelerating / same velocity **ignore** terminal speed
		iii	A has positive gradient / slope, C negative gradient / slope **and** C is steeper / A is shallower	1	**ignore** in opposite direction **allow** going up and going down for positive and negative gradients **ignore** reference to increasing or decreasing speed **allow** C is more sloped ORA **allow** reference to time ie 12 secs v 8 secs remember both parts needed for one mark
	b	i	change .....time (1)	1	**both** needed **allow** increase / decrease / AW for change **allow** any correct unit of time **not** t^2 **ignore** t
		ii	6000 (N) (2) **but** if answer is incorrect 1200 x 5 (1)	2	
		iii	1600000 (J) (2) **but** if answer is incorrect 8000 x 200 (1)	2	
			Total	**9**	

Question			Expected Answers	Marks	Additional Guidance
11	a		more energy / work needed to drive car up steeper / higher hill / ora (1) great**er** PE increase / ora (1) **any one from:** Leon and Amelia have different driving styles idea of different road surface/ idea that Leon may be using more electrical equipment in the car or have windows open / Leon may stop and start several times / Amelia does it in one go (1)	3	**just** steeper hill is not enough **not** kinetic energy **ignore** power **allow** examples of different driving styles eg Leon in different gear / accelerates more quickly / different speeds **ignore** Leon is heavier / greater mass (than Amelia)
	b		increases by four / quadruples / x4 (1)	1	**ignore** just 'increases'
			Total	**4**	

Question			Expected Answers	Marks	Additional Guidance
12			higher lower friction (1) lower maximum / higher locking (1)	2	**all** three responses needed for first mark **all** three responses needed for second mark
			Total	**2**	

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