

Additional Science B

General Certificate of Secondary Education

Unit **B623/01**: Modules B3, C3, P3

Mark Scheme for January 2011

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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1 Abbreviations, annotations and conventions used in the detailed Mark Scheme.

/	= alternative and acceptable answers for the same marking point
(1)	= separates marking points
not	= answers which are not worthy of credit
reject	= answers which are not worthy of credit
ignore	= statements which are irrelevant
allow	= answers that can be accepted
()	= words which are not essential to gain credit
—	= underlined words must be present in answer to score a mark
ecf	= error carried forward
AW	= alternative wording
ora	= or reverse argument


Question			Expected Answers	Marks	Additional Guidance
1	(a)	(i)	nucleus (1)	1	allow chromosomes (1) ignore brain
		(ii)	DNA (1)	1	
	(b)		sheep (1)	1	allow Dolly (1) ignore any other name
	(c)		tick in second box (the technique took years to develop) (1)	1	more than one answer 0 marks allow answer correctly indicated e.g. ringed.
			Total	4	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	light (1) gravity (1)	2	allow the sun / sunlight (1) allow higher level answers e.g phototropism (1) not negative phototropism allow geotropism (1) not negative geotropism allow water/moisture (1) allow higher level answers e.g. hydrotropism (1) ignore nutrients
	(b) (i)	auxin (1)	1	allow IAA (1) ignore ethene / ethylene
	(ii)	tick in third box (when the plant produces flower) (1)	1	more than one answer 0 marks allow answer correctly indicated e.g. ringed.
	(c)	any two from: repair damage (1) replace worn out cells (1) reproduction / make new plants (1) produce flowers (1) make fruits/ seeds (1)	2	allow to multiply / replicate (1)
	(d)	cell wall (1) vacuole (1)	2	
	(e)	transferring/moving a gene / DNA from one organism to another (1)	1	allow moving a gene into an organism (AW) (1)
		Total	9	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	alveoli (1)	1	allow alveolus (1) allow phonetic spellings
	(b)	ticks in first (oxygen enters the blood in the lungs) and third (oxygen leaves the blood in body tissue) boxes (1)	1	need both correct for one mark multiple ticks i.e. over two = 0 marks allow answer correctly indicated e.g. ringed.
	(c)	they are cells that have not differentiated / become specialised / they still have the ability to differentiate / specialise / can become different types of cells or tissues / become windpipe cells (1)	1	answer requires a concept of change into a new type of cell allow does not have a purpose yet for undifferentiated (1) allow can form / change into any cell (1) ignore can grow / repair / copy wind pipe ignore can mutate to form new cells ignore can make cells but allow can make different cells (1)
		Total	3	

Question		Expected Answers	Marks	Additional Guidance
4	(a)	capillary / capillaries (1)	1	
	(b)	artery / arteries (1)	1	
	(c)	23 (%) (1)	1	
	(d)	aorta (1)	1	allow aortic (arch / artery) (1)
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
5	(a)	sulfur (1)	1	allow S (1)
	(b)	oxygen (1)	1	allow O / O ₂ (1)
	(c)	hydrogen (1)	1	allow H / H ₂ (1)
	(d)	aluminium (1)	1	allow Al (1) allow zinc / Zn (1)
	(e)	chlorine (1)	1	allow Cl / Cl ₂ (1)
	(f)	bromine (1)	1	allow Br / Br ₂ (1)
		Total	6	

Question		Expected Answers	Marks	Additional Guidance
6	(a)	car (bodies) / fences / gates / posts / tools / engines/domestic appliances / magnets/ construction e.g in building / pipes (1)	1	allow other uses of iron / steel (1) ignore making steel / electrical wires
	(b)	flexibility / ductile / (good) conductor of electricity (1)	1	allow does not corrode (1) ignore good conductor not heat conductor ignore malleable
	(c)	tick in second box (most metals are good conductors of heat) (1)	1	more than one answer = 0 marks allow answer correctly indicated e.g. ringed.
	(d)	close together (1) in a pattern (1)	2	allow packed tightly together / no room to move (1) ignore squashed together / do not move allow rows / straight lines / lined up neatly (1) allow lattice = 1 mark allow marks for a diagram  is 2 marks limit of acceptability 'staying in a straight line and there is no space' =2 marks
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
7	(a)	4 (1)	1	
	(b)	has two (occupied) shells (1)	1	allow rings / orbits / for shells (1) allow two energy levels (1) ignore outer/ level on its own / layers
	(c)	It is the number of / there are 12 / particles in the nucleus / there are 6 protons and 6 neutrons / it is the number of protons and neutrons (1)	1	the limit of acceptability is there are 12 particles in the middle (1) allow 12 protons and / plus neutrons (1) ignore 6 protons and neutrons not 'there are 12 protons / neutrons' reference to electrons = 0
	(d)	electron is -1 / negative / minus / - (1) neutron is 1 (1)	2	allow any negative number (1) ignore 0.9995 allow +1 (1) not -1
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
8	(a)	any two from: (stops) reaction with water (1) (stops) reaction with oxygen/air (1)	2	not it is reactive allow reacts with moisture (1) allow it reacts with moist air (2) allow stops contact with air (1) allow stops contact with water (1) allow very reactive / highly reactive =1 mark if no other mark scored
	(b)	potassium is more reactive (than lithium) / ora (1)	1	allow potassium has more (shielding) shells / potassium loses electrons more easily (1) allow they become more reactive as they go down the group.(1) ignore potassium is below lithium in group 1 ignore potassium reacts more allow higher up in reactivity series / table (1)
	(c)	electron(s) (1)	1	allow negative charge(s) (1)
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
9	(a)	1 st answer (distance) – tape measure (1) 2 nd answer (time) – stopwatch (1)	2	accept only answers from the list
	(b)	m/s or ms ⁻¹ (1)	1	allow metres per second (1) ignore mph / mps / km/h
	(c)	Citroen (1)	1	allow answer ticked or indicated on the table mark answer line first
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
10		Rajwan (decreasing speed) Bekky (steady speed) Jac (increasing speed) maximum (2)	2	3 correct scores (2) 1 or 2 correct scores (1)
		Total	2	

Question		Expected Answers	Marks	Additional Guidance
11	(a)	distance / length / number of metres travelled / AW (1) whilst driver reacts / AW (1)	2	allow how far car moves (1) not how long 'the distance travelled whilst the driver reacts' scores 2 'the distance travelled whilst the driver thinks' scores 1 'the time it takes for the driver to react' scores 1 the distance the car travels from when he/she first sees the hazard to applying the brakes scores 2
	(b)	distance car moves from start of braking to stopping / AW (1)	1	allow distance car moves with brakes on (1) not how long
	(c)	36 (m) (1)	1	
		Total	4	

Question			Expected Answers	Marks	Additional Guidance
12	(a)	(i)	petrol (1) diesel (1)	2	allow LPG (1) allow biodiesel for diesel (1) ignore oil on its own
		(ii)	more / greater distance travelled (on a litre) / AW (1)	1	not merely 'it travels 23 km on 1 litre' limit of acceptability 'goes on for longer' allow uses less fuel to travel same distance (1) allow highest fuel consumption / highest figure in table is 23 (1)
	(b)		use of battery / solar cells / fuel cells(1)	1	allow solar powered (1) but not just solar on its own allow need for charging/charging points (1) allow power stations (1) (ignore all other ways of generating electricity) ignore sun / light / solar energy
			Total	4	

Question			Expected Answers	Marks	Additional Guidance
13	(a)	(i)	20 000 (J) scores (2) But if answer incorrect 20 x 1 000 scores (1)	2	
		(ii)	1000 (N) (1)	1	
	(b)		(gravitational) potential (energy) (1)	1	allow PE or GPE (1) allow gravitational (1) ignore gravity
	(c)		(KE) increases scores (1) but (KE) quadruples / AW scores (2)	2	allow doubles (1) not merely 'changes' ignore speed increases award the marking points for correct calculations allow ideas of proportionality to v^2
			Total	6	

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