



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme

June 2003

GCSE

Science: Double Award Modular

3468

Paper 2F

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Question 1

	answers	extra information	mark
	decay		1
	warm	} these words can be either order	1
	moist		1
	grow		1
total			4

Question 2

	answers	extra information	mark
(a)	habitats destroyed	accept idea that the places to live or food or minerals are reduced or less shelter	1
(b)	any two from fertilisers / named fertilisers pesticides herbicides	accept sewage / lime	2
total			3

Question 3

	answers	extra information	mark
	camouflage (when hunting)	accept the idea that the white coat prevents the prey or predator 'seeing' the Arctic fox	1
	insulation (from cold)	accept an idea that the thick coat retains body heat or traps air or that air in the fur is a poor conductor or keeps it warm	1
	NEUTRAL RESPONSES – protection, waterproof		
total			2

Question 4

	answers	extra information	mark
(a)	<p>Quality of Written Communication <i>The answer to this question requires ideas in good English, in a sensible order with correct use of scientific terms. Quality of written communication should be considered in crediting points in the mark scheme.</i></p>	<p><i>max 2 if ideas not well expressed</i></p>	
	in summer more greenfly	accept increase in population	1
	in winter less greenfly	accept decrease in population	1
	over the three years greenfly numbers decrease		1
		accept fall or drop for decrease	
(b)	<p>any one from</p> <p>(number of) greenfly severe or cold winters toxic chemicals destruction of habitats disease predators weather temperature</p>	do not accept food	1
total			4

Question 5

	answers	extra information	mark
(a)	(highly) flammable	accept will (easily) catch fire / burn do not accept explosive	1
(b)	oxygen	ignore any numbers	1
	water	accept hydrogen oxide / steam	1
(c)	catalyst		1
total			4

Question 6

	answers	extra information	mark
(a)	wine		1
	bread		1
(b)(i)	advantage – bring about reactions at normal temperatures and pressures	accept the idea that they speed up (chemical) reactions or acts as a catalyst	1
(ii)	disadvantage – they are only active over a given temperature range	accept the idea that they are damaged at high temperatures / are pH sensitive	1
total			4

Question 7

	answers	extra information	mark
(a)	Yes – plants will grow faster	the answer yes or no does not gain a mark do not accept grow better	1
	more food available, greater yield		1
	OR		
	No – plants still grow without adding nitrates	accept the idea that small amounts of nitrate could be used	(1)
	(nitrates) can ‘kill’ babies / causes brain damage in babies	do not accept can stop respiration in babies	(1)
(b)(i)	2	accept two	1
(ii)	$2 \times 14 + 4 \times 1 + 3 \times 16$ $= 80$		1
			1
	$\frac{28}{80} \times 100 = 35\%$	allow 1 mark for correct working for percentage $28/Y \times 100$, where Y is an incorrect formula mass allow 2 marks for formula mass of 80 where no working or correct working is shown allow 3 marks for 35 where no working or correct working is shown	1
total			6

Question 8

	answers	extra information	mark
	B and D (either order)		1
	B and D (either order)	accept A and C	1
	A or C		1
total			3

Question 9

	answers	extra information	mark
(a)	time		1
	force		1
(b)	any three from <ul style="list-style-type: none"> • driver's reactions are slow(er) • poor weather conditions • greater mass or weight • poor road conditions • poorly maintained brakes • worn tyres 	accept driver could have taken drugs or alcohol or due to tiredness or distractions accept raining or snowing or fog / mist (poor visibility) oil / gravel / mud / leaves / wet / icy / going downhill do not accept driver's weak foot force	3
total			5

Question 10

	answers	extra information	mark
(a)	comet		1
(b)	elliptical		1
total			2

Question 11

	answers	extra information	mark
(a)	polar		1
(b)	any two from (satellite B) moves at the same speed as the Earth spins so (satellite B) remains in the same relative position (above the Earth) so (satellite) dishes do not have to move able to cover a large area of the Earth	accept geostationary for one mark only	2
total			3

Question 12

	answers	extra information	mark
(a)	low		1
	hydrogen		1
(b)	any three from <ul style="list-style-type: none"> • flame • reacts with oxygen • carbon dioxide carbon monoxide forms • water (vapour) forms • energy released 	accept it is a blue / yellow colour accept burns in oxygen / bonds broken accept CO ₂ arco / bonds forming in CO ₂ /CO and H ₂ O bonds forming 1 mark max accept an oxide of hydrogen or H ₂ O accept heat or light released / temperature increase / exothermic	3
total			5

Question 13

	answers	extra information	mark
(a)	Using wind (advantage) any one from can be used in remote locations renewable clean	accept does not cause pollution to the air / land	1
	Using wind (disadvantage) any one from does not generate much (electrical) energy many hundreds wind turbines would be needed the wind is unreliable noise / visual pollution	accept many hundreds wind turbines would be needed or too much land would be needed for wind farms or wind energy is 'dilute' accept the wind does not blow all of the time or the wind is not always strong enough do not accept just the word pollution	1
	Using coal (advantage) any one from can generate electricity all of the time generates a lot of (electrical) energy	accept reliable electrical / energy supply	1
	Using coal (disadvantage) any one from pollution by carbon dioxide / greenhouse gas non renewable pollution by sulphur dioxide / acid rain	accept slow start-up time or production of ash or difficult to transport (coal) or there's not much coal left	1
(b)	all link lines correct	accept one link line correct for one mark	2
total			6

Question 14

	answers	extra information	mark
	plants use <u>carbon dioxide</u> during <u>photosynthesis</u>	references to oxygen / energy are neutral	1
	carbon is used to make carbohydrates or named carbohydrate	accept to make fats / proteins / sugars do not accept food	1
	plants eaten by animals for carbohydrates or named carbohydrate	accept for / carbon / fats / proteins / sugars	1
	during <u>respiration</u> animals release <u>carbon dioxide</u>		1
total			4

Question 15

	answers	extra information	mark
(a)	any two from <ul style="list-style-type: none"> deforestation reduces carbon dioxide removal from the atmosphere burning wood / trees (releases carbon dioxide) microbes decay / decompose wood / trees (releasing carbon dioxide) 	accept less photosynthesis for reduces carbon dioxide removal accept cutting down trees for deforestation ignore cutting down plants accept there are less trees to remove carbon dioxide	2
(b)	may cause a rise in sea level may cause changes in the Earth's climate	accept may cause polar / ice caps to melt / flooding do not accept global warming or greenhouse effect or erosion accept causes changes in the weather or named, comparative type of weather or drought accept seasonal changes	1 1
(c)	methane	accept natural gas or CH ₄	1
total			5

Question 16

	answers	extra information	mark
(a)	as a catalyst	accept to speed up the reaction (equilibrium)	1
(b)	nitrogen + hydrogen \rightleftharpoons ammonia $N_2 + H_2 \rightleftharpoons NH_3$	accept mixed formula / word equations ignore balancing	1
(c)(i)	the reaction is reversible / an equilibrium	accept that ammonia can break down again into nitrogen and hydrogen accept reaction goes both ways do not accept some nitrogen and hydrogen do not react	1
(ii)	(the gases are cooled) <u>ammonia</u> removed as a liquid <u>nitrogen</u> and <u>hydrogen</u> are recycled	no marks as given in the diagram accept correct formulae NH_3 , N_2 H_2 accept <u>ammonia</u> liquefies or condenses accept <u>nitrogen</u> and <u>hydrogen</u> are put back through the converter accept 'other gases' only if ammonia identified for first mark	1 1
total			5

Question 17

	answers	extra information	mark
(a)	the concentration of the (nitric) acid is decreasing (the volume of carbon dioxide remains at 83 cm^3) when the concentration of the (nitric) acid is zero	accept the number of acid particles is decreasing or there are fewer collisions accept no acid remains or all the acid is used up or no acid particles	1 1
(b)	line starts at origin is steeper and remains to the left of the original line graph line levels off at 83 cm^3 and before 12 minutes	tolerance $\pm \frac{1}{2}$ square	1 1
(c)	change the temperature	accept increase or decrease the temperature accept change (increase or decrease) the concentration (of the nitric acid) ignore amounts of reactants or changes in pressure or stirring or use of catalyst	1
total			5

Question 18

	answers	extra information	mark
(a)	mass		1
(b)	work (done) = force (applied) × distance (moved in the direction of the force)	do not accept correctly substituted figures for this equation mark accept $W = Fs$ or $W = Fd$ or $W = Fh$ (well done) = force × height) mark formula independently	1
	$1\,000\,000 \times 15$ $= 15\,000\,000$ J / joules	allow $1\,000\,000 \times \frac{15}{1000}$ $= 15\,000$ KJ / kilojoules	1 1 1
		allow $1\,000\,000 \times 1500$ $= 1\,500\,000\,000$ for 1 mark only – no unit mark allow 3 marks for correct answer if no working / correct working is shown	
(c)	Quality of written communication <i>The answer to this question requires ideas in good English, in a sensible order with correct use of scientific terms. Quality of written communication should be considered in crediting points in the mark scheme.</i>	<i>Max. 4 if ideas not well expressed</i>	
	A – B not moving	accept stationary or at rest	1
	B – C acceleration or C – D acceleration	accept increases speed / velocity accept gets faster	1
	comparison made that the acceleration B – C is less than C – D	accept comparison made that the acceleration C-D is greater than B-C	1
	D – E constant velocity	accept steady speed or at 0.4 m/s	1
	E – F deceleration	accept decreases speed / velocity accept gets slower	1
total			10

Question 19

	answers	extra information	mark
(a)(i)	variable resistor	accept rheostat	1
(ii)	potential difference = current \times resistance	accept $V = IR$ or any correct combinations	1
(b)(i)	as the potential difference increases, the current increases	accept it increases	1
	at low values of the potential difference the current is (directly) proportional or at higher values of potential difference the current is not (directly) proportional	accept at low values of the potential difference (the filament) obeys Ohm's law or accept at higher values of the potential difference (the filament) does not obey Ohm's law accept it increases but not proportionally for 2 marks	1
(ii)	the resistance (of the filament) increases		1
	the temperature (of the filament) increases		1
total			6

Question 20

	answers	extra information	mark
(a)	(permanent) magnet		1
(b)	any three from <ul style="list-style-type: none"> • the speed of the bicycle increases • the strength of the magnetic field is increased • the number of turns on the coil is increased • the area of the coil is greater • use a smaller rotor • move magnet closer to coil • add an iron core to coil • move the wire turns closer together 	accept turn magnet faster accept use a stronger magnet do not accept use a bigger magnet accept increase number of coils accept diameter of <u>coil</u> is increased	3
total			4

TOTAL MARKS FOR PAPER = 90