

Chemistry B

General Certificate of Secondary Education

Unit **B642/01**: Modules C4, C5, C6 (Foundation Tier)

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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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)	takes place all of the time / works 24-7 / AW (1)	1	
	(b)	(i) carbon monoxide + methanol → ethanoic acid (1)	1	allow mixture of correct formulae and names allow $\text{CO} + \text{CH}_3\text{OH} \rightarrow \text{CH}_3\text{COOH}$ allow = in equation not & or and or + energy
		(ii) any three from: energy / heating / lighting / electricity / gas / power / maintaining temperature / maintaining pressure / AW (1) starting materials / raw materials / carbon monoxide / methanol (1) catalyst (1) labour / salaries / workers / wages (1) research / development (1) pollution control (1) rates / taxes / rent (1) health and safety / maintenance (of equipment) (1) plant costs / equipment (1)	3	ignore transport / packaging / advertising / storage / insurance ignore cost of selling allow ingredients allow marketing allow cost of the factory itself
	(c)	(i) increases / goes up (1)	1	
		(ii) decreases / goes down (1)	1	
Total			7	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	graphite (1)	1	
	(b)	buckminster fullerene (1)	1	allow buckminster / fullerene / buckyball
	(c)	buckminster fullerene – black solid and soluble in petrol diamond – transparent solid, does not conduct electricity and has a high melting point graphite – grey-black solid, does conduct electricity and has a high melting point all three correct (2) but one or two correct (1)	2	
Total			4	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	9 (1)	1	
	(b)	potassium iodide / KI (1)	1	allow iodide
	(c)	nitrogen and potassium (1)	1	both required for mark allow K and N
	(d)	101 (1)	1	
	(e) (i)	white (1)	1	
	(ii)	$\frac{1.68}{2.24} \times 100$ (1) but 75 (2)	2	allow $\frac{am}{pm} \times 100$ for one mark if answer incorrect allow full marks for 75% with no working out
	(iii)	any two from: reaction is not complete (1) liquid lost when pouring from one container to another / AW (1) solid left behind in beaker / AW (1) excess ammonium sulfate not used (1)	2	allow one mark for idea of careless practical technique eg Luke spilt it on the bench
		Total	9	

Question		Expected Answers	Marks	Additional Guidance
4	(a)	(gas) syringe (1)	1	
	(b)	(i) 30 (seconds) (1)	1	
		(ii) 64 (cm ³) (1)	1	
		(iii) 0 – 3 seconds (1)	1	allow correct answer ticked, circled or underlined on list if answer line is blank
	(c)	acid has run out / sodium nitrite has run out / reactants have run out (1)	1	allow no more acid left / no more sodium nitrite left ignore nitrogen runs out ignore nothing left to react
	(d)	does not completely dissociate / does not completely ionise (1) has hydrogen ions / has a pH between 3 to 6.99 (1)	2	allow forms an equilibrium mixture allow pH less than 7
		Total	7	

Question		Expected Answers	Marks	Additional Guidance
5	(a)	0.23 (g)	1	
	(b)	(anode) gets smaller (1) (cathode) gets larger / gains copper / plated with copper (1)	2	allow anode starts to dissolve allow (anode) decreases allow cathode goes black allow (cathode) increases if reversed allow one mark
	(c)	$\text{OH}^- / \text{SO}_4^{2-}$ (1)	1	allow hydroxide / sulfate
		Total	4	

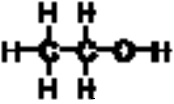
Question		Expected Answers	Marks	Additional Guidance
6	(a)	pipette (1)	1	allow measuring cylinder / burette ignore measuring jug / beaker
	(b)	increases / AW (1)	1	allow reference to correct change in pH values eg goes from 1 to 5 ignore pH goes neutral / pH goes green
	(c)	use of universal indicator (1) match colour against a colour chart / AW (1)	2	allow use of pH paper second marking point is not dependent on correct indicator
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
7	(a)	NaO (1)	1	allow correct answer ticked, circled or underlined on list if answer line is blank
	(b)	Na ₂ O ₂ – solid H ₂ O – liquid NaOH – aqueous all three correct (2) but one or two correct (1)	2	
	(c)	evidence that 1.95 is one quarter of 7.8 (1) 0.4 (g) (1)	2	allow full marks for correct answer on the answer line whether or not there is any working out
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
8	(a)	calcium hydrogencarbonate (1)	1	allow correct answer ticked, circled or underlined in list if answer line blank allow $\text{Ca}(\text{HCO}_3)_2$
	(b)	calcium carbonate (1)	1	allow CaCO_3
		Total	2	

Question		Expected Answers	Marks	Additional Guidance	
9	(a)	solvent / fuel (for cars) (1)	1	allow (used in) methylated spirits / meths allow replacement for petrol allow mouthwash / (making) perfume / disinfectants / sterile wipes ignore cleaner / vinegar	
	(b)	oxygen absent temperature of 35°C enzyme found in yeast present all three correct (2) but if one or two correct (1)	2	If four given then only award one mark if two or three are correct <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	
	(c)	(i)	ethene + water → ethanol (1)	1	allow = instead of → but not and / & allow steam instead of water allow C ₂ H ₄ + H ₂ O → C ₂ H ₆ O / word equation with mix of correct formulae and words and ignore incorrect balancing
		(ii)	hydration (1)	1	allow correct answer ticked, circled or underlined in list if answer line blank
		Total		5	

Question		Expected Answers	Marks	Additional Guidance
10	(a)	tube 2: no water (1) tube 3: no oxygen (1)	2	allow test tube 2 dry air allow no air in test tube 3
	(b)	any two from: oil / grease (1) galvanising / coating with zinc / coating with chromium (1) sacrificial protection / attach magnesium to iron (1) alloying / making stainless steel (1) tin plate / tinning (1)	2	allow coating the iron in plastic allow chrome plating ignore keep it away from water or oxygen / keep it dry
	(c)	redox (1)	1	
		Total	5	

Question		Expected Answers	Marks	Additional Guidance	
11	(a)	ethanol is  (1) paracetamol is $C_8H_9NO_2$ (2)	3	allow any order of symbols if there is any error in counting atoms allow one mark if one error and no marks if two errors eg $C_8H_8O_2N$ (1), C_8H_9O (1) but $C_8H_8O_2$ (0) if a molecular formula is not written allow one mark if all the atom counting is correct eg C_8H_9ONO (1) and C_8H_8NOOH (1) if an atom counting error and a formula error then 0 marks eg C_8H_8ONO	
	(b)	(i)	reduces pain (1)	1	allow correct answer ticked, circled or underlined in list if answer line blank.
		(ii)	aspirin (1)	1	allow any named correct example eg dispirin, ibuprofen, calpol
		Total		5	

Question		Expected Answers	Marks	Additional Guidance
12	(a)	chlorine (1)	1	ignore Cl not chloride
	(b)	3 (1)	1	
	(c)	(increased risk of) sunburn / (accelerated) ageing of skin / skin cancer / increased risk of cataracts (1)	1	allow make you look older ignore just cancer allow damage to eyes
		Total	3	

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