



# GCSE

## 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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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

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

B642/01

Mark Scheme

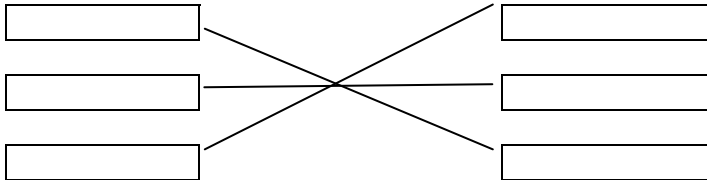
January 2011

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 $\rightarrow$ ethanoic acid (1)	1	<b>allow</b> mixture of correct formulae and names <b>allow</b> $\text{CO} + \text{CH}_3\text{OH} \rightarrow \text{CH}_3\text{COOH}$ <b>allow</b> = in equation <b>not</b> & or and or + energy
		(ii)	<b>any three from:</b> 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	<b>ignore</b> transport / packaging / advertising / storage / insurance <b>ignore</b> cost of selling  <b>allow</b> ingredients   <b>allow</b> marketing   <b>allow</b> cost of the factory itself
	(c)	(i)	increases / goes up (1)	1	
		(ii)	decreases / goes down (1)	1	
			<b>Total</b>	<b>7</b>	

B642/01

Mark Scheme

January 2011

Question			Expected Answers	Marks	Additional Guidance
2	(a)		graphite (1)	1	
	(b)		buckminster fullerene (1)	1	<b>allow</b> 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 <b>three</b> correct (2) but <b>one</b> or <b>two</b> correct (1)	2	
			<b>Total</b>	<b>4</b>	

B642/01

Mark Scheme

January 2011

Question			Expected Answers	Marks	Additional Guidance
3	(a)		9 (1)	1	
	(b)		potassium iodide / KI (1)	1	<b>allow</b> iodide
	(c)		nitrogen and potassium (1)	1	<b>both</b> required for mark <b>allow</b> K and N
	(d)		101 (1)	1	
	(e)	(i)	white (1)	1	
		(ii)	$\frac{1.68}{2.24} \times 100$ (1)  <b>but</b>  75 (2)	2	<b>allow</b> $\frac{am}{pm} \times 100$ for one mark if answer incorrect  <b>allow</b> full marks for 75% with no working out
		(iii)	<b>any two from:</b> 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	<b>allow</b> one mark for idea of careless practical technique eg Luke spilt it on the bench
			<b>Total</b>	<b>9</b>	

B642/01

Mark Scheme

January 2011

Question			Expected Answers	Marks	Additional Guidance
4	(a)		(gas) syringe (1)	1	
	(b)	(i)	30 (seconds) (1)	1	
		(ii)	64 (cm <sup>3</sup> ) (1)	1	
		(iii)	0 – 3 seconds (1)	1	<b>allow</b> 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	<b>allow</b> no more acid left / no more sodium nitrite left <b>ignore</b> nitrogen runs out <b>ignore</b> 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	<b>allow</b> forms an equilibrium mixture  <b>allow</b> pH less than 7
			<b>Total</b>	<b>7</b>	

B642/01

Mark Scheme

January 2011

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	<b>allow</b> anode starts to dissolve <b>allow</b> (anode) decreases  <b>allow</b> cathode goes black <b>allow</b> (cathode) increases  if reversed <b>allow</b> one mark
	(c)		$\text{OH}^- / \text{SO}_4^{2-}$ (1)	1	<b>allow</b> hydroxide / sulfate
			<b>Total</b>	<b>4</b>	



B642/01

Mark Scheme

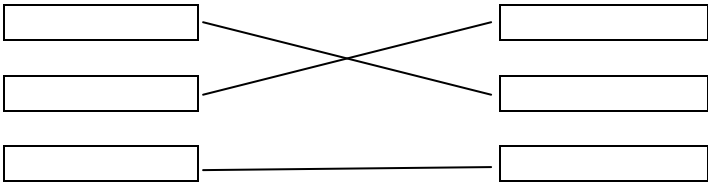
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Question			Expected Answers	Marks	Additional Guidance
6	(a)		pipette (1)	1	<b>allow</b> measuring cylinder / burette <b>ignore</b> measuring jug / beaker
	(b)		increases / AW (1)	1	<b>allow</b> reference to correct change in pH values eg goes from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

B642/01

Mark Scheme

January 2011

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

B642/01

Mark Scheme

January 2011

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

B642/01

Mark Scheme

January 2011

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

B642/01

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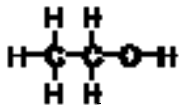
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Question			Expected Answers	Marks	Additional Guidance
10	(a)		tube 2: no water (1) tube 3: no oxygen (1)	2	<b>allow</b> test tube 2 dry air <b>allow</b> no air in test tube 3
	(b)		<b>any two from:</b> oil / grease (1) galvanising / coating with zinc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

B642/01

Mark Scheme

January 2011

Question			Expected Answers	Marks	Additional Guidance
11	(a)		ethanol is  (1) paracetamol is $C_8H_9NO_2$ (2)	3	<b>allow</b> any order of symbols if there is any error in counting atoms <b>allow</b> 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	<b>allow</b> correct answer ticked, circled or underlined in list if answer line blank.
		(ii)	aspirin (1)	1	<b>allow</b> any named correct example eg dispirin, ibuprofen, calpol
			<b>Total</b>	<b>5</b>	

B642/01

Mark Scheme

January 2011

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
			<b>Total</b>	<b>3</b>	

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