

Chemistry B

General Certificate of Secondary Education **B642/01**

Unit 2: Modules C4, C5, C6

Mark Scheme for June 2010

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Question			Expected Answers	Marks	Additional Guidance
1	(a)	(i)	sodium / Na^+ (1)	1	
		(ii)	chloride / Cl^- (1)	1	
	(b)		barium chloride (1)	1	answer on answer line takes precedence but allow other ways of indicating answer e.g. ticking or ringing barium chloride
	(c)	(i)	it is alkaline (1)	1	answer on answer line takes precedence but allow other ways of indicating answer e.g. ticking or ringing alkaline
		(ii)	add universal (indicator) / pH paper (1) compare colour obtained against a colour chart / AW (1)	2	indicator on its own is not sufficient not litmus / phenolphthalein / methyl orange allow full range indicator allow colour chart mark even with wrong indicator allow its colour tells you the pH but to see what colour it goes is not sufficient allow examples of matching colour with pH e.g. if it is green then pH is 7 – the colour stated must match the pH i.e. red, yellow, orange for a pH below 7 and blue-green, blue or purple for pH above 7 colour linked to acid, alkali or neutral is not sufficient
			Total	6	

Question			Expected Answers	Marks	Additional Guidance
2	(a)		any value between 20 to 40 (1) because label has 40°C (as maximum wash temperature) / enzymes will not be denatured (1)	2	unit not needed allow enzyme will not be destroyed / enzymes work best at this temperature / lowers 'carbon footprint' / helps to reduce global warming / AW not enzymes die
	(b)	(i)	makes clothes whiter than white / AW (1)	1	allow makes clothes look whiter ignore all references to making colours brighter
		(ii)	removes stains / AW (1)	1	allow kills microbes / bacteria not removes germs allow bleach stains
Total				4	

Question			Expected Answers	Marks	Additional Guidance
3	(a)		any two from: crushed (1) with sand / in a mortar and pestle (1) dissolved in a solvent (1) distillation (1) chromatography (1)	2	allow squeezed / ground up ignore filtration allow dissolved in water / dissolved in a named solvent / made into a solution allow description of distillation allow a description of chromatography
	(b)	(i)	made in small amounts / made on demand / when needed (1)	1	allow does not run 24/7 allow not a continuous process
		(ii)	any two from: testing of chemicals / research / trialling (1) long time to complete development (1) staff / wages / labour costs (1) raw materials needed (1) cost of equipment (1) safety (1) marketing / advertising (1)	2	ignore all references to the environment allow cost of chemicals ignore transport
Total				5	

Question		Expected Answers	Marks	Additional Guidance
4	(a)	to make plants grow bigger / to make plants grow faster / to increase crop yield / replace essential elements (1)	1	allow to make more money allow replace nitrogen / replace potassium / replace phosphorus / replace nutrients ignore to make plants grow i.e. without any qualification not kills weeds / pests ignore plants grow healthier
	(b)	hydrogen and nitrogen (1)	1	allow N_2 and H_2 allow any order
	(c)	$\% \text{ yield} = \frac{\text{actual mass}}{\text{predicted mass}} \times 100 / \frac{37.5}{50} \times 100 (1)$ 75 (1)	2	allow $\frac{\text{am}}{\text{pm}} \times 100$ allow full marks for correct answer with no working out
	(d)	2 (1)	1	answer on answer line takes precedence but allow other ways of indicating answer e.g. ticking or ringing 2
		Total	5	

Question			Expected Answers	Marks	Additional Guidance
5	(a)	(i)	3 (1)	1	allow three
		(ii)	$C_2H_2O_4$ (1)	1	allow any order of symbols not use of superscripts not use of h rather than H
	(b)	(i)	red / pink (1)	1	not orange / orange red / red orange
		(ii)	H^+ (1)	1	answer on answer line takes precedence but allow other ways of indicating answer e.g. ticking or ringing H^+
	(c)		(gas) syringe (1)	1	
	(d)	(i)	60 (1)	1	unit not needed
		(ii)	36 - 38 (1)	1	unit not needed
		(iii)	reactant runs out / no more acid / no more magnesium / AW (1)	1	allow all reactants / substances reacted ignore all the magnesium has dissolved
			Total	8	

Question		Expected Answers	Marks	Additional Guidance
6	(a)	0.32 (1)	1	unit not needed
	(b)	5.12	1	unit not needed not 5.1
	(c)	44 (1)	1	unit not needed
Total			3	

Question			Expected Answers	Marks	Additional Guidance
7	(a)	(i)	H_2O (1)	1	
		(ii)	Cu^{2+} / H^+ (1)	1	
	(b)		goes up / AW (1) goes down / AW (1)	2	
			Total	4	

Question		Expected Answers	Marks	Additional Guidance
8	(a)	any three from: nitric acid or potassium hydroxide in the burette (1) measure known volume of other chemical and put into beaker or flask (1) add indicator to flask (1) add chemical from burette until indicator changes colour (1) record volume of chemical in burette used (1)	3	allow use a pipette to measure volume / measure 25.0 cm ³ of chemical but measure volume of chemical in burette that just makes the indicator change colour scores (2)
	(b)	add water (1)	1	
	(c)	sulfuric acid / hydrochloric acid / phosphoric acid	1	allow H ₂ SO ₄ / HCl / H ₃ PO ₄ allow other strong acids such as HBr / HI
		Total	5	

Question			Expected Answers	Marks	Additional Guidance
9	(a)	(i)	carbon, fluorine, chlorine (1)	1	not symbols not chloride / fluoride
		(ii)	5 (1)	1	
	(b)	(i)	aerosols (1)	1	
		(ii)	hydrocarbons / HCFC's / named hydrocarbon / nitrogen / HFC's (1)	1	
	(c)		any two from: sunburn(1) ageing of skin (1) skin cancer (1) cataracts (1)	2	ignore sunstroke ignore damage to skin ignore premature ageing without reference to skin allow damage to eyes ignore blindness
			Total	6	

Question		Expected Answers	Marks	Additional Guidance
10	(a)	an ion- exchange column (1)	1	answer on answer line takes precedence but allow other ways of indicating answer e.g. ticking or ringing an ion - exchange column
	(b)	any two from: use same volume of water each time (1) add soap solution to water and shake (1) continue to add soap until lather stays / add the same volume of soap (1) AND hardest water needs the most volume of soap / hardest water gives the least amount of lather / ora (1)	3	allow a measured volume e.g. 25 cm ³ of both water samples allow the same amount of water allow add soap and stir allow add the same amount of soap this marking point must link with the third marking point i.e. continue to add soap links with most volume of soap indicates hardest water or add the same amount of soap links with least amount of lather indicates hardest water ignore amount of scum produced
		Total	4	

Question			Expected Answers	Marks	Additional Guidance
11	(a)	(i)	ethene + water → ethanol (1)	1	allow $C_2H_4 + H_2O \rightarrow C_2H_5OH$ / $C_2H_4 + H_2O \rightarrow C_2H_6O$ allow mix of names and correct formulae allow steam for water allow = sign for arrow not and or & for + not + catalyst / + heat in the equation but allowed over the arrow
		(ii)	hydration (1)	1	answer on answer line takes precedence but allow other ways of indicating answer e.g. ticking or ringing hydration
		(iii)	(pass ethanol vapour over heated) catalyst (1)	1	allow (concentrated) sulfuric acid / (concentrated) phosphoric acid / high temperature / heat / any quoted temperature equal or above 150°C ignore the name of any named catalyst e.g. 'iron catalyst' would be awarded a mark ignore reference to pressure
	(b)		distillation (1)	1	
			Total	4	

Question		Expected Answers	Marks	Additional Guidance
12	(a)	any two from: oil / grease (1) paint (1) galvanising / coat with zinc (1) sacrificial protection / use of named sacrificial metal (1) alloying (1)	2	allow layer of plastic (1)
	(b)	correct order (1) zinc iron tin	1	allow correct symbols Zn Fe Sn ignore zinc sulfate / iron sulfate / tin sulfate
Total			3	

Question		Expected Answers	Marks	Additional Guidance
13	(a)	chlorine (1)	1	allow correct symbol C/
	(b)	(i) water is not a pollutant	1	allow makes water only allow does not produce greenhouse gases / CO ₂ / no carbon emissions / low carbon footprint ignore does not give off any pollution
	(ii)	electrical (1)	1	answer on answer line takes precedence but allow other ways of indicating answer e.g. ticking or ringing electrical
Total			3	

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