OCR
RECOGNISING ACHIEVEMENT

GCSE

Chemistry B

General Certificate of Secondary Education

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

Mark Scheme for June 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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The **Abbreviations, annotations and conventions** used in the detailed Mark Scheme are:

/	=	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	optical brightener (1)	1	**allow** other ways of indicating correct response e.g. ringing or ticking the correct answer
		ii	remove stains / remove colour (1)	1	**ignore** kills bacteria **ignore** removes dirt
	b		optimal temperature is 35 ^{o}C / best temperature is 35 ^{o}C (1) more washing powder the faster the cleaning / washing power increases with amount of powder (1)	2	**allow** as temperature increases washing ability goes up and then goes down / ora / aw **allow** around 35^{0}C it takes less time for the stain to be removed
	c		saves energy / can wash delicate clothes / colour does not become paler (1)	1	**allow** reduces the carbon footprint / less greenhouse gases / less global warming / aw **allow** clothes will not lose colour / clothes will not shrink / clothes will not be damaged **allow** enzymes are not denatured **ignore** reference to cost **ignore** reference to environmentally friendly
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
2	a		sodium / Na^+ (1)	1	**allow** other ways of indicating correct response e.g. ringing or ticking the correct answer
	b		silver nitrate (1)	1	**allow** other ways of indicating correct response e.g. ringing or ticking the correct answer
	c		white (1)	1	**allow** other ways of indicating correct response e.g. ringing or ticking the correct answer
	d		potassium chloride + barium sulfate (1)	1	**allow** KC*l* + $BaSO_4$ **allow** mix of name and correct formula **allow** products in any order **both** required for the mark
	e		(prevents death) from water borne diseases / aw (1)	1	**allow** named disease such as cholera and dysentery **allow** can die from disease (in water) / reduce disease / dirty water contains harmful bacteria / dirty water contains pathogens **allow** clean water reduces disease **ignore** to survive / prevents illness / might die / to stay healthy
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
3	a		products are made on demand / periodically in a batch process but all the time in a continuous process / aw	1	to gain 1 mark both processes have to be referred to **allow** batch made in small / separate amounts and continuous in large amounts **allow** continuous works 24-7 but batch works for short periods of time
	b		**any two from:** starting materials / raw materials / reactants / barium peroxide / sulfuric acid / hydrogen / oxygen(1) catalyst (1) labour / salaries / workers (1) pollution control (1) rates / taxes (1) health and safety (1) maintenance of equipment / plant costs / equipment (1) quality control / testing (1)	2	**allow** materials on its own **allow** disposal of waste **ignore** environmental factors **ignore** cost of **running** plant or factory
	c		**any two from:** plant is crushed / plant is ground down (1) use of a solvent / use of named solvent (1) distillation (1) chromatography (1)	2	**allow** cut the plant / squeeze the plant **allow** dissolve in water / steam (with water) / boil with water
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
4	a		1 (1)	1	
	b		through the roots (1)	1	**allow** dissolved in water / by osmosis **ignore** leaves
	c	i	ammonium sulfate (1)	1	**allow** other ways of indicating correct response e.g. ringing or ticking the correct answer
		ii	acidic (1)	1	**allow** contains hydrogen ions / weakly acidic **ignore** weak or strong
	d		60 (1)	1	
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
5	a	i	CH_3COOK (1)	1	**allow** other ways of indicating correct response e.g. ringing or ticking the correct answer
		ii	(aq) (1)	1	**allow** other ways of indicating correct response e.g. ringing or ticking the correct answer
	b		burette (1)	1	
	c	i	3.7 (1)	1	**allow** any value between 3.6 and 3.8
		ii	24 (cm^3) (1)	1	
	d		colourless in acid (1) pink in alkali (1)	2	**allow** one mark for colours reversed i.e. pink in acid and colourless in alkali
			Total	**7**	

Question			Expected Answers	Marks	Additional Guidance
6	a		$C_2H_2O_4$ (1)	1	**allow** any order of atomic symbols **not** C2H2O4 / $C^2H^2O^4$
	b		H^+ (1)	1	**allow** other ways of indicating correct response e.g. ringing or ticking the correct answer
	c		it is a stronger acid / contains more H^+ ions in solution / has a lower pH (with same concentration) (1)	1	assume answer refers to HCL unless specified **allow** it is not organic / contains chlorine / does not contain carbon / does not contain oxygen / not found in rhubarb leaves / found in stomach / reacts with silver nitrate / reacts with lead nitrate / reacts faster with Mg / reacts faster with oxides / reacts faster with carbonates / more acidic
	d	i	carbon dioxide (1)	1	**allow** CO_2
		ii	will react with metal / will react with the element / corrodes the kettle (1)	1	**allow** strong(er) acid / it is strong(er) / it has too low a pH the kettle, metal or element is damaged is not sufficient **ignore** it is toxic / erode
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
7	a	i	cathode (1)	1	
		ii	OH^- (1)	1	**allow** SO_4^{2-}
	b		negative electrode – potassium (1) positive electrode – chlorine (1)	2	**allow** one mark for potassium and chlorine but with the wrong electrodes **not** chloride
			Total	**4**	

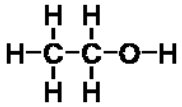
Question			Expected Answers	Marks	Additional Guidance
8			**one mark from:** a raw material sulfur / water / oxygen / air (1) **any one mark from either** a correct reaction sulfur burns in air to make sulfur dioxide / sulfur + oxygen → sulfur dioxide / sulfur dioxide reacts with oxygen to make sulfur trioxide / sulfur dioxide + oxygen → sulfur trioxide / sulfur trioxide reacts with water to make sulfuric acid / sulfur trioxide + water → sulfuric acid (1) **or** a correct condition 450 ^{o}C / high temperature / 1 – 10 atmospheres pressure / atmospheric pressure (vanadium(V) oxide) catalyst	2	names of raw materials may be obtained from reaction equations. **not** any named incorrect raw material e.g. hydrogen
			Total	**2**	

Question			Expected Answers	Marks	Additional Guidance
9			idea that mass of LHS – mass of K_2CO_3 is the mass of oxygen / 93 – 69 (1) 24 (g) (2)	2	**award full marks** for correct answer with no working out or incorrect working out mark the answer line **first** of all
			Total	**2**	

Question			Expected Answers	Marks	Additional Guidance
10	a	i	19 (^{0}C) (1)	1	unit **not** required
		ii	zinc+ copper sulfate → copper + zinc sulfate (1)	1	**allow** = instead of → but **not** and / & **allow** correct formulae but **ignore** balancing **/** Zn + $CuSO_4$ → Cu + $ZnSO_4$ **allow** mix of correct formulae and words
	b		order of reactivity magnesium, zinc, iron, tin (1)	1	
	c		**any two from:** paint (1) galvanising / plate with zinc (1) sacrificial protection / bolt on lump of magnesium (1) alloying (1) tin plate (1)	2	**allow** coating with plastic / enamelling / other metal
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
11	a		fats are solids and oils are liquids (1)	1	**allow** one is a solid one is a liquid
	b	i	(compound **B**) has a (carbon-carbon) double bond	1	
		ii	bromine (water) (1) goes red-brown to colourless / yellow to colourless / decolourised (1)	2	**allow** 2 marks for bromine water is decolourised **ignore** goes clear **allow** any shade of brown **allow** goes colourless **not** goes discoloured
	c		emulsion (1)	1	**allow** other ways of indicating correct response e.g. ringing or ticking the correct answer
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
12	a		gas **A** is hydrogen (1) (litmus paper) is bleached / loses colour / turns white (1)	2	**allow** H or H_2 for hydrogen **allow** goes paler
	b		sterilise water / make solvents / make household bleach / make plastics (1)	1	**allow** making TCP / disinfectant / make medicines / produce (H)CFC's **ignore** swimming pools on its own / clean the water / clean swimming pools / medical uses
			Total	**3**	

Question			Expected Answers	Marks	Additional Guidance
13	a	i	chlorine, fluorine and carbon (1)	1	**ignore** Cl, F and C **allow** any order
		ii	9 (1)	1	
		iii	ethanol is  (1)	1	**allow** displayed formula with no bond shown between O and H
	b		hydration	1	**allow** other ways of indicating correct response e.g. ringing or ticking the correct answer
			Total	**4**	

Question			Expected Answers	Marks	Additional Guidance
14	a		electrical (1)	1	**allow** other ways of indicating correct response e.g. ringing or ticking the correct answer
	b		fuel cells **only** produce water (which is not a pollutant) /	1	**no mark** for just repeating that burning petrol makes carbon dioxide or a fuel cell makes water. The statement must be qualified in some way as suggested in the expected answer.
			fuel cells do not produce greenhouse gases / carbon dioxide /		**allow** using fuel cells would prevent global warming (1) burning petrol causes global warming (1)
			burning petrol produces carbon dioxide which is a pollutant / greenhouse gas /		**ignore** fuel cells do not create pollution on its own / petrol releases pollutants / fuel cells do not give off poisonous gases
			fuel cells are more efficient / fuel cells will not use up oil supplies / fuel cells use renewable resources (1)		
	c		fuel cells are **more** efficient /	1	**allow ora** if batteries are specified
			fuel cells are light**er** than batteries /		**ignore** more energy is produced
			fuel cells can be used continually / fuel cells do not need to be charged /		**allow** fuel cells do not run out / fuel cells last longer / fuel cells do not need to be replaced
			fuel cells use the same fuel that propels the rocket /		
			fuel cells produce water that can be used to drink (1)		**not** reference to pollution
			Total	**3**	

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