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Mark Scheme (Results)

Summer 2014

Pearson Edexcel GCSE
in Chemistry (5CH3F) Paper 01

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- For questions worth more than one mark, the answer column shows how partial credit can be allocated. This has been done by the inclusion of part marks eg (1).
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- Write legibly, with accurate spelling, grammar and punctuation in order to make the meaning clear
- Select and use a form and style of writing appropriate to purpose and to complex subject matter
- Organise information clearly and coherently, using specialist vocabulary when appropriate.

Full marks will be awarded if the candidate has demonstrated the above abilities.

Questions where QWC is likely to be particularly important are indicated (QWC) in the mark scheme, but this does not preclude others.

Question Number	Answer	Acceptable answers	Mark
1(a)	Increases {plant/ crop} growth/ yield/ size/ growth rate Adds minerals/ specified suitable element eg N, P, K/ nutrients	Allow synonyms for increase eg promote, helps, enhances etc Reject kills pests	**(1)**

Question Number	Answer	Acceptable answers	Mark
1(b)	A description linking two of the following • gets washed into water (1) • encourages growth of algae/ weed / algal bloom (1) • algae use up oxygen (1) • algae blocks sunlight (1) • **kills** <u>aquatic</u> life (1) • eutrophication (1) • contaminates drinking water (1)	Allow any sensible water eg river, lake etc but ignore sea Ignore damages, harms etc; allow any specified **water** life eg fish, **water** plants, animals **in water** Ignore effect of fertiliser on field eg on weeds.	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(c)(i)	ammonia + nitric acid → ammonium nitrate (2) Spelling must be correct but allow missing one 'm' from ammonia and/or ammonium	LHS (1) R ammonium RHS (1) R ammonia nitrate Allow fully correct balanced equation for 2 Ignore state symbols. If mixed words/symbols, any side with symbols scores 0.	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(c)(ii)	**A** corrosive		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(d)(i)	(reaction is) **reversible** / (reaches dynamic) **equilibrium**	Allow equilibria R static equilibrium	**(1)**

Question Number	Answer	Acceptable answers	Mark
1(d)(ii)	**C** NH_3		**(1)**

(Total for Question 1 = 8 marks)

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	D provides enzymes		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	An explanation linking any two of • {no/little/less} ethanol formed • {no/little/less} fermentation/ reaction • enzyme denatured/damaged/ does not work/ works less well/ changes shape	ignore enzyme killed/died	**(2)**

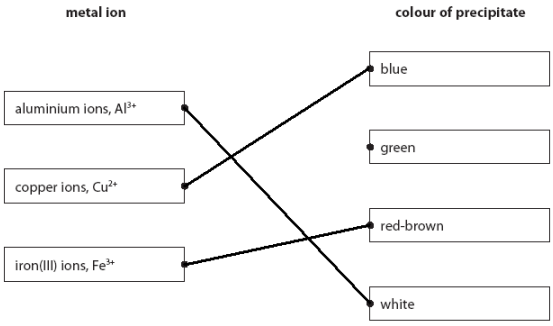
Question Number	Answer	Acceptable answers	Mark
2(b)	A description linking • heat /use of Bunsen with any one of • ethanol has low(er) boiling point/ boils at 78°C • ethanol distils/ boils/ evaporates (first) • condenser cools the vapour / ethanol condenses	Ignore references to less water in the resultant liquid or to any prior or subsequent separation techniques.	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(c)	An explanation linking any two of • alcohol impairs thought processes/concentration/vision / judgment/coordination/ makes sleepy / dizzy • increases reaction times/thinking time/ affects motor skills/ makes more aggressive /slows your reactions • increases risk of accident/ driving would be more careless/ hazardous	Must be reasonably specific eg allow 'impairs thinking', do not allow 'affects the brain'	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(d)	alk**a**ne(s) Exact spelling required	reject alk**e**ne(s)	**(1)**

(Total for Question 2 = 8 marks)

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	**D** calcium		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(b)	three correct lines – 2 marks two correct lines – 1 mark  	If more than one line leaves a metal ion on the left, ignore them.	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(c)	**B** cream		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(d)	A description linking any two from • (mix then) effervesces/ fizzes/ bubbles (1) • gas into limewater (1) • limewater goes cloudy/ milky/ white (1)	Ignore carbon dioxide	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(e)	A description including • check whether water is: pure/ contaminated (or not)/ safe (to drink)/ will not cause illness • to detect toxins / harmful substances / bacteria / named disease /chlorine/ hardness/ to find what substances are present in water / to meet UK standards	Ignore clean	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(f)	• qualitative – what is present (1) • quantitative – how much / what quantity (1) If definitions reversed or unspecified (eg 'one tells you what is there, one how much', allow 1	Do not allow 'quality'	**(2)**

(Total for Question 3 = 10 marks)

Question Number	Answer	Acceptable answers	Mark
4(a)(i)	NaCl	Must be capital N, C; small a, l	**(1)**

Question Number	Answer	acceptable answers	Mark
4(a)(ii)	as a coolant/ removes **heat** energy	(good) conductor of heat Ignore what would happen if no coolant eg 'meltdown' etc.	**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	reduction Exact spelling required.		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	**A** ions can only move freely in molten lead bromide		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)(iii)	(lead bromide →) lead (1) + brom**in**e (1)	reject bromide or any formulae ignore state symbols	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(c)(i)	**A** and **B** both required for mark.		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(c)(ii)	• **A** permanent hardness because scum/ no lather (even after boiling) (1) • **B** temporary hardness because lather /no scum (only) after boiling (1) • **C** soft because lather / no scum (before boiling) / does not conduct /no ions (1)	If no or some/all incorrect explanations, then allow: 3 correctly classified with 2 correct explanations = 3 marks 3 correctly classified with 1 correct explanation = 2 marks 3 correctly classified with 0 correct explanations = 1 Allow statements such as 'only in test 3' to mean 'after boiling'	**(3)**

(Total for Question 4 = 10 marks)

Question Number	Answer	Acceptable answers	Mark
5(a)	mass of magnesium sulfate = 18.50 – 18.20 (1) (= 0.30 (g)) conc = <u>ans to subtraction /0.3</u> (1) 0.5 (= 0.6 g dm^{-3})	Allow mark if you see 0.3 Give 2 if answer is 0.6.	**(2)**

Question Number	Answer	Acceptable answers	Mark
5(b)(i)	pipette allow any recognisable spelling.		**(1)**

Question Number	Answer	Acceptable answers	Mark
5(b)(ii)	named indicator (1) colour in alkali (1) colour at end point / in acid (1) for example: phenolphthalein (1) pink/ purple (1) colourless (1) methyl orange (1) yellow (1) orange/pink (1)	if no indicator named/ substance named is not an indicator then score 0 for whole part. Indicator spelling has to be recognisable. Litmus (paper/ solution) allowed if universal indicator (allow 'indicator paper') **and** correct colours (allow neutral or acid colour for colour at end) allow 1 mark only.	**(3)**

Question Number		Indicative Content	Mark
QWC	***5(c)**	A description including some of the following points **Salt formation** • measure sulfuric acid into a beaker / suitable vessel • stir • heat / warm beaker and sulfuric acid (over a Bunsen flame) • add copper oxide • until solid remains **Separation** • filter the mixture • to remove excess / unreacted copper oxide **Crystallisation** • collect filtrate / copper sulfate solution in an evaporating basin • heat until concentrated / half evaporated • allow to cool and crystallise • pour off remaining solution to leave crystals • dry crystals eg filter paper/ oven/warm place	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited description e.g. add copper oxide to sulfuric acid in a beaker and mix/stir • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple description e.g. add copper oxide to sulfuric acid in a beaker until no more reacts and filter off the unreacted copper oxide • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed description e.g. add copper oxide to sulfuric acid, filter, allow filtrate to crystallise, dry crystals • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

(Total for Question 5 = 12 marks)

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	ester allow any recognisable spelling.		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	{pleasant / sweet/ fruity} **smell**	allow nice smell / ester is soluble in alcohol / ester is non-toxic [must be specific for this mark]	**(1)**

Question Number	Answer	Acceptable answers	Mark
6(b)	An explanation to include any two from: • used to form fibres • cheaper clothing • stops landfill filling up/ polyesters non-biodegradable • reduces waste / polyester is not wasted • preserves **oil** supplies • less energy required to recycle	Ignore 'environmentally friendly' and other slogans Note: answer must be about why recycling occurs, not about properties of polyester as such	**(2)**

Question Number	Answer	Acceptable answers	Mark
6(c)	A description to include any two from • mix oil and alkali <u>in suitable container</u> • heat / boil mixture • add sodium chloride / salt • scrape / filter off soap • suitable safety precaution: glasses / gloves		**(2)**

Question Number		Indicative Content	Mark
QWC	***6(d)**	A description including some of the following points neutralisation reactions attempts at balanced equations are creditworthy (eg even if incorrect, evidence of knowledge of products can be given) **reaction with metals** reacts with metals eg magnesium effervescence / gas/ bubbles/ hydrogen salt formed **reaction with bases** reacts with bases eg sodium hydroxide water formed salt formed **reaction with carbonates** reacts with carbonates effervescence / gas / bubbles carbon dioxide evolved salt formed **effect on indicators** changes colour of acid-base indicators named indicator colour change pH less than 7	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited description e.g. a brief indication of one reaction • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple description e.g. a brief indication of two characteristic reactions • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed description e.g. two reactions with one well developed in its description • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

(Total for Question 6 = 12 marks)