



Independent Schools
Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

SCIENCE

LEVEL 2

CHEMISTRY

MARK SCHEME

This is a suggested, not a prescriptive, mark scheme.

Tuesday 28 January 2014



Q.	Answer	Mark	Additional Guidance
1. (a)	nitrogen	7	
(b)	oxygen		
(c)	increase		
(d)	a compound		
(e)	filtrate		
(f)	decomposition		
(g)	Na		
2. (a)	X: (round bottomed) flask Y: thermometer Z: (Liebig) condenser	3	
(b)	(simple) distillation	1	
(c)	100°C	1	both figure and unit needed
(d)	both evaporate together/alcohol and water have close boiling points	1	
3. (a) (i)	1–6	1	
(ii)	8–14	1	
(b) (i)	neutralisation	1	
(ii)	sodium hydroxide + hydrochloric acid → sodium chloride + water	3	1 mark for both reactants 1 mark for each product
(c)	Universal Indicator solution/paper check colour against pH chart	2	accept answer involving pH meter
(d) (i)	volume of sodium hydroxide	1	
(ii)	any value greater than 7, up to 14	1	
(e) (i)	alkali/sodium hydroxide	1	
(ii)	20 cm ³ of alkali needed to neutralise 10 cm ³ acid – therefore alkali more dilute	1	

Q.	Answer	Mark	Additional Guidance												
4. (a)	carbon and hydrogen	1	both needed – no extras												
(b)	carbon dioxide water	1 1													
(c)	carbon monoxide formed which is toxic	2													
(d)	weigh the canister first weigh at end of day; take difference	2													
(e)	particles get further apart particles move faster	2													
(f)	C_4H_{10}	1													
5. (a) (i)	proper scale added AND labelled	1													
(ii)	<p>mass of copper sulphate, in grams, dissolved in 100 cm³ water</p> <table border="1"> <caption>Data points from the graph</caption> <thead> <tr> <th>Temperature (°C)</th> <th>Mass of copper sulphate (g)</th> </tr> </thead> <tbody> <tr> <td>20</td> <td>32</td> </tr> <tr> <td>40</td> <td>43</td> </tr> <tr> <td>50</td> <td>45</td> </tr> <tr> <td>60</td> <td>62</td> </tr> <tr> <td>70</td> <td>74</td> </tr> </tbody> </table> <p>temperature, in °C</p>	Temperature (°C)	Mass of copper sulphate (g)	20	32	40	43	50	45	60	62	70	74	2	<p>2 marks for all 6 points plotted accurately</p> <p>1 mark for 3, 4 or 5 points plotted accurately</p>
Temperature (°C)	Mass of copper sulphate (g)														
20	32														
40	43														
50	45														
60	62														
70	74														
(iii)	point at 50°C circled	1													
(iv)	best fit line drawn – must be a curve	1													

Q.	Answer	Mark	Additional Guidance
(b)	solubility increases with increasing temperature reference to curved nature of graph/ solubility increases by greater amounts at higher temperature etc.	2	
(c) (i)	56–58 grams	1	check with graph
(ii)	equivalent to 40 grams per 100 cm ³ 36 °C	2	check with graph
(d)	blue solution blue (undissolved) solid (at the bottom)	2	
6. (a)	unreactive with water strong malleable/flexible/bendable	2	any two points
(b)	strong cheap low reactivity/does corrode but can be protected	2	any two points
(c)	zinc more reactive than iron/physical barrier prevents body corroding	2	
(d)	unreactive – no reaction with water malleable/flexible	2	any sensible alternative
7. (a)	chromatography	1	
(b)	<i>diagram or description should contain:</i> spots of ink both from note and suspects' pens on chromatography paper solvent allow to soak up paper note/measure height of spots compare with ransom note ink neat, correct diagram	4	to achieve 4 marks, account must give clear explanation of how the suspect's pen ink is linked to ink from the ransom note
Total		60	