Past Papers Int 1 Chemistry

2013 Marking Scheme

Grade Awarded	Mark Required (/60)	Mark Required %	% candidates achieving grade
A	42+	70%	30.6%
B	36+	60%	24.8%
C	30+	50%	21.6%
D	27+	40%	7.6%
No award	<27	<40%	15.3%

Section:	Multiple Choice	Extended Answer
Average Mark:	12.6 /20	24.0 /40

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MC Qu	Answer	% Pupils Correct	Reasoning
1	D	65	☒A oxygen does not dissolve in water ☒B nitrogen does not dissolve in water ☒C hydrogen does not dissolve in water ☑D Carbon dioxide dissolves in water to produce fizzy drinks e.g. lemonade
2	A	55	☑A when *no more salt can dissolve* then a saturated solution has been formed ☒B *a little salt* is not enough salt (solute) to produce a saturated solution ☒C *as much water* would mean the solution is dilute and not saturated ☒D *add more water* would mean the salt solution is more dilute not saturated
3	A	57	☑A Boiling/evaporation is a physical change and <u>not</u> a chemical reaction ☒B A gas being given off is a sign of a chemical reaction ☒C Energy being given out is a sign of a chemical reaction ☒D A precipitate (solid) being formed is a sign of a chemical reaction
4	C	62	☒A The amount of catalyst remains the same during a chemical reaction ☒B Catalysts speed up chemical reactions ☑C Catalysts are not used up in a chemical reaction ☒D Catalysts speed up chemical reactions
5	D	38	☒A salt crystals contain ions as there are charged particles in the structure ☒B Strong bonds are found between ions ☒C salt crystals contain ions as there are charged particles in the structure ☑D Charge particles are ions and there are strong bonds are found between ions
6	B	36	☒A Sulphur dioxide has a formula of SO_2 and contains 3 atoms (1xS + 2xO) ☑B Sulphur trioxide has a formula of SO_3 and contains 4 atoms (1xS + 3xO) ☒C Dinitrogen Tetroxide has a formula of N_2O_4 and contains 6 atoms (2xN + 4xO) ☒D Carbon monoxide has a formula of CO and contains 2 atoms (1xC + 1xO)
7	D	69	**Order** / **Number** / **Reasoning** 1st / 4 / Volume of dilute sulphuric acid must be measured as it is a reactant needed before chemical reaction can start 2nd / 2 / Reactants are mixed and form products during chemical reactants 3rd / 3 / Excess reactant (copper carbonate) must be removed from the products of the reactants for product can be collected 4th / 1 / Copper sulphate is separated from water by evaporation of water
8	C	62	potassium hydroxide + sulphuric acid → potassium sulphate + water ALKALI + ACID → SALT + WATER
9	C	67	Metal: X / Y / Z Reactivity: least reactive / most reactive / medium reactivity Reasoning: dull glow indicates a low reactivity / Bursting in flames indicated a high reactivity / Z is more reactive than X but less reactive than Y
10	B	75	☒A Electroplating involves coating a metal in a less reactive metal to protect it ☑B Galvanising involves dipping iron into molten zinc to protect the iron ☒C Greasing involves protection of metal by keeping water away from metal underneath ☒D Tin protects iron by barrier method if the tin layer is not scratched
11	B	90	☒A T-shirt needs to be flame-resistant ☑B This t-shirt is strong, good at absorbing water and flame resistant ☒C T-shirt needs to be hard wearing so cannot have a weak strength ☒D T-shirt needs to be good at absorbing water

12	D	72	☒A Sand could cut off oxygen from the oil fire and extinguish the fire ☒B A fire blanket will cut off oxygen from the oil fire and extinguish the fire ☒C Carbon dioxide would extinguish an oil fire as the CO_2 layer cuts off oxygen ☑D Water should never be added to an oil fire as the water will cause the oil fire to become worse as oil and water do not mix
13	B	51	☒A Peat is not a fossil fuel (not been in ground for long enough to be classed fossil) ☑B Oil and petrol are made from crude oil. Crude oil is a fossil fuel. ☒C Hydrogen is not a fossil fuel and can be made from water ☒D ethanol is a renewable fuel made from sugar cane
14	A	45	☑A Cracking splits larger hydrocarbons into smaller, more useful hydrocarbons ☒B Decomposition involves break down of biological material not hydrocarbons ☒C Polymerisation involves small molecules joining together to form large polymers ☒D Distillation separates mixtures of chemicals with different boiling points
15	C	54	☒A Pipe must be non-soluble in water to be effective for use in the ground ☒B Pipe material must be thermoplastic if it is to mounded together ☑C Pipe materials must be thermoplastic, insoluble in water and ☒D Pipe material must be thermoplastic if it is to mounded together
16	B	86	carbon dioxide + water $\xrightarrow[\text{light}]{\text{chlorophyll}}$ glucose + oxygen
17	C	61	
18	D	75	glucose + oxygen $\longrightarrow$ carbon dioxide + water
19	B	62	☒A Increased carbon dioxide in air causes global warming (greenhouse effect) ☑B Increased carbon dioxide in air causes global warming (greenhouse effect) ☒C Increased burning of fossil fuels increases the carbon dioxide levels in air ☒D Cutting down trees increases the carbon dioxide levels in air
20	A	69	☑A sodium phosphate can be used as a fertiliser as it is soluble and contains phosphorus ☒B magnesium phosphate is insoluble in water ∴ cannot be used as a fertiliser ☒C iron phosphate is insoluble in water ∴ cannot be used as a fertiliser ☒D calcium phosphate is insoluble in water ∴ cannot be used as a fertiliser

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<table>
<tr><th>Long Qu</th><th>Answer</th><th>Reasoning</th></tr>
<tr><td>1a(i)</td><td>I</td><td>Iodine is element 53 on the periodic table and has the symbol I</td></tr>
<tr><td>1a(ii)</td><td>Fluorine, chlorine, bromine or astatine</td><td>Elements in the same group have the same chemical properties. Iodine is found in group 7 of the periodic table</td></tr>
<tr><td>1b</td><td>One from:
Supply/enhance nutrition
Improve keeping qualities
Improve flavour</td><td><table><tr><th>Food Additive</th><th>Reason for Use</th></tr><tr><td>Vitamins & Minerals</td><td>supply or enhance the nutritional value of food</td></tr><tr><td>Preservatives</td><td>improve the keeping qualities of food</td></tr><tr><td>Food Colouring</td><td>Alter the Appearance of food</td></tr><tr><td>Flavouring</td><td>alter the flavour of food</td></tr></table></td></tr>
<tr><td>1c</td><td>To restore essential elements in the soil</td><td>Artificial fertilisers are used to restore nitrogen, phosphorus and potassium to the soil which is removed by growing crops</td></tr>
<tr><td>2a</td><td>carbon and chlorine</td><td><table><tr><td>-ide</td><td>Compound contains the two named elements</td></tr><tr><td>-ate</td><td>Compound contains 3 elements (two named elements + oxygen)</td></tr><tr><td>-ite</td><td>Compound contains 3 elements (two named elements + oxygen)</td></tr></table></td></tr>
<tr><td>2b</td><td>1933</td><td>Problem Solving: Extraction of information from bar chart</td></tr>
<tr><td>2c</td><td>$C_2H_3Cl_3$</td><td>The numbers should be subscripts (smaller and below the line)</td></tr>
<tr><td>3a</td><td>temperature</td><td>Int1 PPA 1.1 Technique Question</td></tr>
<tr><td>3b</td><td>number of turns of test tube</td><td>Int1 PPA 1.1 Technique Question</td></tr>
<tr><td>3c</td><td>Increase in temperature increases the speed of dissolving</td><td>Int1 PPA 1.1 Technique Question</td></tr>
<tr><td>4a</td><td>goes up towards 7</td><td>Acid has a pH below 7 and during neutralisation pH will rise until neutralisation is achieved at pH=7</td></tr>
<tr><td>4b(i)</td><td>B</td><td>☒A Different acid (sulphuric acid) used in this experiment ∴not fair test
☑B Same acid, same concentration, same temperature ∴fair test
☒C Different temperature (35°C) used in this experiment ∴not fair test
☒D Different concentration (1mol/l) used in experiment ∴not fair test</td></tr>
<tr><td>4b(ii)</td><td>test with pH paper/indicator for pH=7 (green)</td><td>If all acid has been neutralised then the pH will have risen up to pH=7 and the colour with pH paper or universal indicator will be green</td></tr>
<tr><td>5a</td><td>Word equation showing:</td><td>water + calcium phosphide
↓
calcium hydroxide + hydrogen + diphosphane</td></tr>
<tr><td>5b</td><td>  </td><td><table><tr><td>Hazard</td><td>Harmful/Irritant</td><td>Poisonous</td><td>Corrosive</td><td>Flammable</td></tr><tr><td>Symbol</td><td>  </td><td>  </td><td>  </td><td>  </td></tr></table></td></tr>
<tr><td>6a</td><td>alloy</td><td>Alloys are mixtures of metals (or a mixture of metals with some non-metals)</td></tr>
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<tr><td>6b</td><td>Chart B</td><td>Chart B is the only chart which shows the tin bar is smaller than the zinc bar</td></tr>
<tr><td>6c</td><td>silver, gold or platinum</td><td>The least reactive metals are found uncombined in the Earth's crust</td></tr>
<tr><td>7a</td><td>A ruler</td><td>PPA Technique Question:
The length of the later above the water is proportional to the volume of the lather produced as the test tube is an equal thickness.</td></tr>
<tr><td>7b</td><td>One from:</td><td><table><tr><td>Temperature</td><td>Concentration of detergent</td><td>Number of shakes</td><td>Force of shake</td></tr></table></td></tr>
<tr><td>7c</td><td>Scum would form</td><td>Scum is an insoluble precipitate formed between detergent and calcium ions in hard water.</td></tr>
<tr><td>8a</td><td>Carbon and hydrogen</td><td>Hydrocarbons: compounds which contain <u>only</u> the elements carbon and hydrogen.</td></tr>
<tr><td>8b</td><td>Combustion</td><td>Combustion is the type of chemical reaction where chemicals burn and join up with oxygen.</td></tr>
<tr><td>8c</td><td>Limited supply of oxygen</td><td>Soot (carbon) and carbon dioxide are only formed during incomplete combustion where the supply of oxygen/air is low.</td></tr>
<tr><td>9a</td><td>Made by scientists/ man-made</td><td>Synthetic materials are not found in nature and are man-made/made by scientists</td></tr>
<tr><td>9b</td><td>Propene</td><td><table><tr><td>Monomer</td><td>ethene</td><td>propene</td><td>chloroethene</td><td>styrene</td></tr><tr><td>Polymer</td><td>poly(ethene)</td><td>poly(propene)</td><td>poly(chloroethene)</td><td>poly(styrene)</td></tr></table></td></tr>
<tr><td>9c</td><td>Produces toxic/ poisonous gases</td><td>Poisonous/toxic gases like carbon monoxide, hydrogen chloride and hydrogen cyanide can be produced during the burning of plastics.</td></tr>
<tr><td>10a</td><td>Bar graph showing:</td><td><table><tr><td>½ mark – x and y axis labels</td><td>½ mark – scale on y-axis correct</td></tr><tr><td>½ mark – points plotted</td><td>½ mark – bars drawn</td></tr></table></td></tr>
<tr><td>10b(i)</td><td>2</td><td>$\text{Mass of fibre} = \frac{\%\ \text{fibre}}{100} \times \text{mass of cereal} = \frac{4}{100} \times 50 = 2\text{g}$</td></tr>
<tr><td>10b(ii)</td><td>Prevents constipation or keeps the gut working well</td><td>Fibre keeps the gut working well, preventing constipation. Fibre absorbs water and swells; this provides bulk for the gut muscles to work on as food is squeezed along.</td></tr>
<tr><td>11a</td><td>Plants or Marine Life</td><td>Fats and oils have three sources in our diet:<table><tr><td>Animal Fat</td><td>Animals Fat</td><td>e.g. lard</td></tr><tr><td>Vegetables</td><td>Vegetable oils</td><td>e.g. olive oil</td></tr><tr><td>Marine Life</td><td>Marine Oils</td><td>e.g. cod liver oil</td></tr></table></td></tr>
<tr><td>11b(i)</td><td>Obese</td><td>Problem Solving: Extracting information from a table</td></tr>
<tr><td>11b(ii)</td><td>25</td><td>$\text{BMI} = \frac{\text{Body weight (kg)}}{\text{Height (m)} \times \text{Height (m)}} = \frac{100}{2.00 \times 2.00} = 25$</td></tr>
<tr><td>12a</td><td>Mashing
Yeast
Carbon dioxide
vinegar</td><td>Problem Solving: Completing flow chart from written information</td></tr>
<tr><td>12b</td><td>Fermentation or anaerobic respiration</td><td>$\text{glucose} \xrightarrow[\text{(no air)}]{\text{yeast}} \text{ethanol} + \text{carbon dioxide}$</td></tr>
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<tr><td>12c</td><td>Ethanol</td><td>Ethanol is the chemical name for the alcohol in drinks</td></tr>
<tr><td>13a</td><td>nitrogen</td><td>
<table>
<tr><th>Food Type</th><th>Carbon</th><th>Hydrogen</th><th>Oxygen</th><th>Nitrogen</th></tr>
<tr><td>Carbohydrates</td><td>✓</td><td>✓</td><td>✓</td><td>×</td></tr>
<tr><td>Fats</td><td>✓</td><td>✓</td><td>✓</td><td>×</td></tr>
<tr><td>Proteins</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
</table>
</td></tr>
<tr><td>13b</td><td>Turns blue</td><td>Ammonia gas is released when proteins are heated with soda lime and ammonia gas turns damp pH paper blue.</td></tr>
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