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Past Papers Int 1 Chemistry

2000 Marking Scheme

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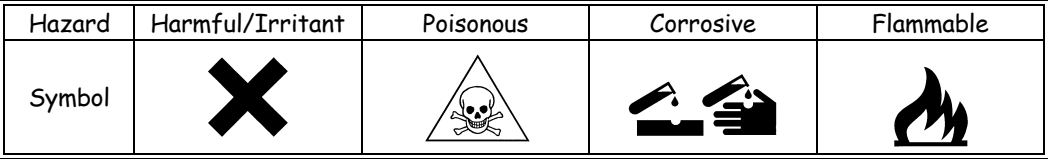
MC Qu	Answer	Reasoning
1	A	☑A Substance shown is an element as it contains only one kind of atom ☒B Substance shown is a compound as different elements are bonded together ☒C Substance shown is a compound as different elements are bonded together ☒D Substance shown is an ionic compound as charged ions are shown in the diagram
2	D	
3	A	☑A Compound shown has the formula C_2H_6O ☒B Compound shown has the formula C_3H_8O ☒C Compound shown has the formula $C_2H_4O_2$ ☒D Compound shown has the formula $C_2H_4O_2$
4	B	☒A Rusting is a chemical reaction: iron + oxygen ⟶ iron oxide ☑B Water boiling is a physical change for liquid water turning into steam ☒C Food digestion is a chemical reaction e.g. starch ⟶ glucose ☒D Gas burning is a chemical reaction e.g. methane + oxygen ⟶ carbon dioxide + water
5	C	sodium hydroxide + nitric acid ⟶ sodium nitrate + water ALKALI + ACID ⟶ SALT + WATER
6	B	☒A Aluminium has a melting point of 660°C and has melted into a liquid at 1000°C ☑B Gold has a melting point of 1064°C and hasn't melted yet at 1000°C ☒C Magnesium has a melting point of 650°C and has melted into a liquid at 1000°C ☒D Silver has a melting point of 962°C and has melted into a liquid at 1000°C
7	D	☒A Sulphur is a non-metal element and does not conduct electricity ☒B Chlorine is a non-metal element and does not conduct electricity ☒C Hydrogen is a non-metal element and does not conduct electricity ☑D Aluminium is a metal element and does conduct electricity
8	C	☒A Aluminium is more reactive than iron so the iron does not rust ☒B Magnesium is more reactive than iron so the iron does not rust ☑C Iron is the more reactive metal forming rust which turns rust indicator a blue colour ☒D Zinc is more reactive than iron so the iron does not rust
9	B	☒A Cotton is a natural fibre made from cotton plants ☑B Nylon is a synthetic (man-made) fibre ☒C Silk is a natural fibre collected from silk worms ☒D Wool is a natural fibre collected from sheep
10	D	☒A PVC is a plastic used to make drainpipes ☒B Perspex is a plastic used in spectacles ☒C Kevlar is a plastic used to make bullet-proof vests ☑D Styrene is the monomer which is used to make the plastic poly(styrene)
11	A	☑A Cracking: Long-chain hydrocarbons are broken into smaller, more useful molecules ☒B Decomposition: The breaking down of biodegradable material (rotting) ☒C Polymerisation: The joining up of smaller monomer molecules to form a polymer ☒D Fractional Distillation: The separation of chemicals with different boiling points
12	A	☑A Gold is a very unreactive metal and is found uncombined in the Earth's crust ☒B Iron is too reactive to be found uncombined in the Earth's crust ☒C Magnesium is too reactive to be found uncombined in the Earth's crust ☒D Sodium is too reactive to be found uncombined in the Earth's crust

<table>
<tr><td>13</td><td>A</td><td>☑A Brass is an alloy as it is a mixture of copper and zinc
☒B Carbon is a non-metal element
☒C Tin is a metal
☒D Rust is a compound called iron oxide</td></tr>
<tr><td>14</td><td>D</td><td>☒A Combustion: The reaction of a substance with oxygen, usually called burning
☒B Respiration: glucose + oxygen $\longrightarrow$ carbon dioxide + water
☒C Fermentation: glucose $\longrightarrow$ ethanol + carbon dioxide
☑D Photosynthesis: carbon dioxide + water $\longrightarrow$ glucose + oxygen</td></tr>
<tr><td>15</td><td>C</td><td>carbon dioxide + water $\xrightarrow[\text{light}]{\text{chlorophyll}}$ glucose + oxygen</td></tr>
<tr><td>16</td><td>D</td><td><table><tr><td>Test for</td><td>Fat/Oil</td><td>Sugars
(except sucrose)</td><td>Starch</td></tr><tr><td>Result</td><td>Oily mark on Filter Paper</td><td>Benedict's solution turns orange</td><td>iodine solution turns blue/black</td></tr></table></td></tr>
<tr><td>17</td><td>B</td><td>☒A 1 glass of wine = 1unit of alcohol ∴ 2 glasses of wine = 2 units of alcohol
☑B 1 whisky = 1 unit of alcohol
☒C 1 bottle of alcopop = 2 units of alcohol
☒D1 pint of beer = 2 units of alcohol</td></tr>
<tr><td>18</td><td>A</td><td>Anodising protects aluminium from corrosion as anodising covers the aluminium in a thin layer of aluminium oxide which prevents air/water getting to the aluminium underneath.</td></tr>
<tr><td>19</td><td>D</td><td>glucose $\xrightarrow[\text{(no air)}]{\text{yeast}}$ ethanol + carbon dioxide</td></tr>
<tr><td>20</td><td>B</td><td>glucose + oxygen $\longrightarrow$ carbon dioxide + water</td></tr>
</table>

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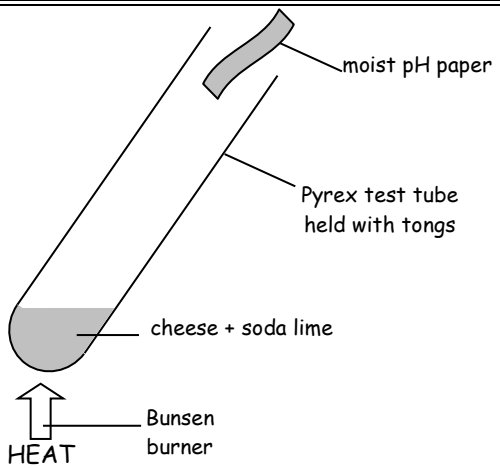
Long Qu	Answer	Reasoning
1a	Bromine or mercury	These are only 2 elements which are liquids at room temperature (25°C)
1b	They have similar chemical properties	Elements in the same group (vertical column) of the periodic table have the same chemical properties e.g. group 1 (alkali metals) all react fast with water
1c	1774	Problem Solving: Information gathering from the data booklet
2a	sodium carbonate sodium silicate (glass)	Problem Solving: Converting information in a written passage into a flow chart
2b	Sodium, silicon and oxygen	-ide: Compound contains the two named elements -ate: Compound contains 3 elements (two named elements + oxygen) -ite: Compound contains 3 elements (two named elements + oxygen) NB metal always comes first in name
2c	SiO_2	Prefix: Mono- / Di- / Tri- / Tetra- Meaning: 1 / 2 / 3 / 4 Example: carbon **mono**xide *CO*; nitrogen **di**oxide NO_2; sulphur **tri**oxide SO_3; carbon **tetra**chloride CCl_4
3a	Dung, manure, compost, slurry, etc	Natural fertilisers return nutrients to the soil to improve the quantities of the essential elements in the soil (nitrogen, phosphorus and potassium)
3b	Potassium, phosphorus or nitrogen	Fertilisers are soluble compounds containing one or more of the following elements: nitrogen, phosphorus and potassium
3c	Increased demand for food from increasing population	World population has increase and to grow the food necessary to feed the world, more fertilisers are used.
4a	ethene	Monomer: ethene / propene / chloroethene / styrene Polymer: poly(ethene) / poly(propene) / poly(chloroethene) / poly(styrene)
4b	polymerisation	Monomer: Small molecules which join together to make polymer Polymer: Large molecule formed by the joining together of monomers Polymerisation: The process where small monomers join together to form a polymer
4c	It will breakdown & leak	The rubbish tip will contain chemicals which you would want to prevent leaking into the water supply. A layer of plastic will contain those chemicals and prevent leakage.
4d	thermoplastic	Thermoplastic: Plastic which will reshape/melt when heated Thermosetting: Plastic which will **not** reshape/melt when heated
5a	gives the body energy fibre	Protein: growth and repair of body tissues Carbohydrate: energy Fat: energy Fibre: keeps gut working properly and prevents constipation
5b	Diagram including:	

<table>
<tr><td>5c</td><td><table><tr><td>Element</td><td>Needed for</td></tr><tr><td>Calcium</td><td>Making bones</td></tr><tr><td>Sulphur</td><td>Forming proteins</td></tr><tr><td>Zinc</td><td>Enzymes</td></tr><tr><td>Iron</td><td>Blood formation</td></tr></table></td><td>Problem Solving: Transfer of information from written passage to table</td></tr>
<tr><td>6a(i)</td><td>Answer to include:</td><td>Put calcium hydroxide solution into test tube
Add few drops of pH indicator/universal indicator (or pH paper)
Compare colour with pH chart
Indicator should turn blue/purple</td></tr>
<tr><td>6a(ii)</td><td>Neutralisation</td><td>Neutralisation: reactions where acids react to form water</td></tr>
<tr><td>6b</td><td>Prevents diseases in plants</td><td>Fungicides prevent plant diseases (e.g. kill fungus) to increase the yield of healthy crops</td></tr>
<tr><td>7a</td><td>Harms marine life (damages environment)</td><td>Oil floats on water and harms marine life (fish/birds)</td></tr>
<tr><td>7b</td><td>Detergents are soluble in both oil and water</td><td>Detergents are soluble in both oil and water and can break up oil into tiny droplets which dissolve in water</td></tr>
<tr><td>7c</td><td>Answer to include:</td><td>• Same volume of water into two test tubes
• Add same volume of detergent to each test tube and stopper
• Shake both hard for 15 seconds or shake same number of times
• Compare height of lather bubbles</td></tr>
<tr><td>8a</td><td>Recycling produces less pollutants
(or name of any one pollutant)</td><td><table><tr><td>Pollutant</td><td>Risk</td></tr><tr><td>sulphur dioxide</td><td>Dissolves in rain water to form acid rain</td></tr><tr><td>dust</td><td>Can start an asthma attack</td></tr><tr><td>carbon monoxide</td><td>Poisonous gas when breathed in</td></tr><tr><td>nitrogen oxides</td><td>Nitrogen dioxide causes acid rain when dissolved in water</td></tr><tr><td>hydrocarbons</td><td>Unburnt hydrocarbons from petrol can cause cancer</td></tr></table></td></tr>
<tr><td>8b</td><td>Bar chart including:</td><td>½ mark – x labels
½ mark – label and scale on y-axis
1 mark – bars drawn correctly</td></tr>
<tr><td>8c</td><td>Acid rain</td><td>Sulphur dioxide dissolves in rain water to form acid rain. (Sulphur in coal/fuels burn to form sulphur dioxide)</td></tr>
<tr><td>9a</td><td>hydrocarbon</td><td>Hydrocarbons: compounds containing carbon and hydrogen only</td></tr>
<tr><td>9b</td><td>Line drawn 20°C to 40°C</td><td>The higher the number of carbons in the alkane, the higher the boiling point
Pentane (C_5H_{12}) must have boiling point above butane (C_4H_{10})</td></tr>
<tr><td>10a</td><td>Temperature</td><td>The title of the investigation at the top of the page is "The Effect of Temperature Changes on Dissolving Speed."</td></tr>
<tr><td>10b</td><td>Number of upturns of test tube to completely dissolve crystals</td><td>The same technique for the upturning of the test tube must be used to ensure that the number of upturns is consistent</td></tr>
<tr><td>11a</td><td>Acidity increases</td><td>The pH number falls from 7 to 5 immediately after eating. The lower the pH number, the greater the acidity.</td></tr>
<tr><td>11b</td><td>Line returns to pH=7 before 11.00am</td><td>Saliva reacts with acid and neutralises the acid. The pH of the mouth will return to pH=7 before 11.00am.</td></tr>
<tr><td>12a</td><td>Chemical which has an effect on the body</td><td>The active ingredient of any medicine is the actual chemical which acts on the body. This chemical may only be in a small quantity so other chemicals are often added to bulk out the medicine into a pill size for a solid medicine or teaspoon size for a liquid medicine.</td></tr>
<tr><td>12b</td><td>5%</td><td>$\%\text{ lemon juice} = \frac{\text{Mass of lemon juice}}{\text{Mass of medicine}} \times 100 = \frac{0.5}{10} \times 100 = 5\%$</td></tr>
<tr><td>12c</td><td>antibiotics</td><td>Antibiotics fight micro-organisms which interfere with the chemical reactions of the body. Antibiotics help the body overcome throat infections</td></tr>
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