Past Papers Int 1 Chemistry

2011 Marking Scheme

Grade Awarded	Mark Required (/60)	Mark Required %	% candidates achieving grade
A	42+	70%	35.1%
B	36+	60%	25.0%
C	30+	50%	20.4%
D	27+	45%	6.0%
No award	<27	<45%	13.5%

Section:	Multiple Choice	Extended Answer
Average Mark:	12.4 /20	25.2 /40

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MC Qu	Answer	% Pupils Correct	Reasoning
1	D	95	<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>
2	B	65	☒A diagram shows an element as only one kind of atom is present ∴ no compound ☑B 2 different elements bonded together ∴ a compound and a molecule ☒C charged particles shown are ions. Substances made of ions have no molecules ☒D diagram shows an element as only one kind of atom is present ∴ no compound
3	D	17	During evaporation of water into steam, the weak bonds between molecules are broken. • Weak bonds due to low boiling point (100°C) • Bonds are not broken inside molecule as no new substance is created during evaporation
4	C	62	☒A acids become less acidic when water is added (dilution) ☒B acids become less acidic when water is added (dilution) ☑C acids become less acidic when diluted and pH increases to pH=7 ☒D acid pH increases to pH=7 during dilution
5	C	41	Salts get their first name from alkali and surname from acid • Sulphuric acid gives salts ending in sulphate
6	A	87	☑A Aluminium is a metal and is a conductor of electricity ☒B Iodine is a non-metal and is a non-conductor of electricity ☒C Silicon is a non-metal and is a non-conductor of electricity ☒D Sulphur is a non-metal and is a non-conductor of electricity
7	C	70	☒A Magnesium is too reactive to be found uncombined in the Earth's crust ☒B Sodium is too reactive to be found uncombined in the Earth's crust ☑C Gold is very unreactive and is found uncombined in the Earth's crust ☒D Iron is too reactive to be found uncombined in the Earth's crust
8	A	43	☑A soap gives a scum with hard water ☒B Shampoo is designed not to give a scum with hard water ☒C washing-up liquid is designed not to give a scum with hard water ☒D soapless detergent is designed not to give a scum with hard water
9	D	63	☒A cracking breaks down less useful hydrocarbons into smaller, more useful hydrocarbons ☒B boiling might damage the clothing and still not remove the oil and grease ☒C oil and grease are not neutralised as they are neither acidic nor alkaline ☑D cleaning chemicals break up oil and grease into tiny droplets as they clean the clothing
10	B	84	☒A Cotton is a natural material made from the cotton plant ☑B Nylon is a synthetic material made by the chemical industry ☒C Silk is a natural material made from silk worms ☒D Wool is natural material made by sheep
11	C	71	☒A greenhouse glass must not become brittle with prolonged exposure to light ☒B greenhouse glass must let light through for the plants to grow. ☑C greenhouse glass must let light through, withstand heat and not become brittle ☒D Greenhouse glass must be able to withstand heat without cracking
12	A	62	Bacteria in soil breakdown biodegradable materials.
13	C	80	☒A Nitrogen gas is not toxic ☒B Water vapour is not toxic ☑C carbon monoxide is toxic and is formed by incomplete combustion of plastics ☒D carbon dioxide is not toxic

<table>
<tr><td>14</td><td>B</td><td>45</td><td>☒A calcium carbonate does not contain nitrogen, phosphorus or potassium
☑B potassium phosphate contains phosphorus and potassium and used as a fertiliser
☒C magnesium chloride does not contain nitrogen, phosphorus or potassium
☒D iron sulphate does not contain nitrogen, phosphorus or potassium</td></tr>
<tr><td>15</td><td>B</td><td>88</td><td><table>
<tr><td>Food</td><td>Bread</td><td>Peanuts</td><td>Rice</td><td>Spaghetti</td></tr>
<tr><td>Fat Content</td><td>2</td><td>49</td><td>1</td><td>1</td></tr>
<tr><td>Carbohydrate Content</td><td>55</td><td>9</td><td>87</td><td>84</td></tr>
</table></td></tr>
<tr><td>16</td><td>D</td><td>64</td><td>More than 60% of body weight is water</td></tr>
<tr><td>17</td><td>A</td><td>40</td><td>Acid and enzymes can break down starch into glucose</td></tr>
<tr><td>18</td><td>D</td><td>28</td><td>☒A Fibre keeps the gut working well to prevent constipation
☒B Fibre swells as it absorbs water and provides the material for the gut wall to push
☒C Fibre keeps the gut working well to prevent constipation
☑D Fibre has no nutritional value other than to keep the gut working well</td></tr>
<tr><td>19</td><td>C</td><td>55</td><td>Fermentation produces alcohol up to a concentration of ~16%
To get the alcohol concentration above 16%, alcohol must be distilled</td></tr>
<tr><td>20</td><td>A</td><td>87</td><td>☑A Antibiotics fight micro-organisms like bacteria
☒B caffeine is a legal drug found in coffee
☒C nicotine is a legal drug found in tobacco
☒D Alcohol is a legal drug found in many drinks</td></tr>
</table>

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Long Qu	Answer	Reasoning
1a	Non-metals	Chlorine and fluorine are found in group 7 (Halogens). Argon is found in group 0 (Noble gases). Groups 7 and 0 are to the right of the STEPS on the Periodic Table are non-metals.
1b	One from:	Helium | Neon | Xenon | Krypton | Radon
1c	To prevent tooth decay	Fluoride is found in toothpaste to strengthen teeth.
2a	To speed up chemical reaction	Catalysts speed up chemical reactions but are not used up in the reaction.
2b(i)	Manganese oxide	Manganese oxide experiment gave off the most lather ($90cm^3$) $\therefore$ reaction is the fastest with manganese oxide catalyst.
2b(ii)	2 from:	Same volume of hydrogen peroxide + detergent | Same mass of catalyst/metal oxide | Same particle size of catalyst/metal oxide
2b(iii)	Relights a glowing splint	Gas: Oxygen | Hydrogen | Carbon Dioxide Test: Relights a glowing splint | Burns with a pop | Turns limewater milky
3a	Colour Change	A chemical reaction takes place when at least one new substance is formed. Four signs of a chemical reaction are: colour change | gas given off | energy change | solid being formed
3b	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
3c	Prevents plant diseases	**Treatment**: Pesticides | Fungicides | Herbicides **Function**: Control/kill pests like insects/slugs | Prevents plant diseases | Kills weeds
4a	Answer to include:	Add pH paper or universal indicator, match colour of pH paper/indicator with pH colour chart and read pH number
4b(i)	E	Acidic: pH below 7 | Neutral: pH=7 | Alkaline: pH above 7 The most alkaline pH is the pH which is the highest value.
4b(ii)	Alkali	Alkali will increase the pH of soil, acid would decrease the pH of soil. Salt and alcohol would not change the pH of soil.
5a	To complete the circuit	Solution containing ions (electrolyte) is require to complete the circuit as the ions move to balance the movement of charge in the cell.
5b	Voltage increases	(Most reactive ⟶ Least Reactive) Magnesium | Aluminium | Zinc | Iron | Tin | Lead | copper Zinc replaced with higher voltage than zinc | lower voltage than zinc
5c	Chemicals run out	The chemical reaction in a battery which produces electricity will stop when one or both chemicals (reactants) in the battery runs out
6a	hydrogen + oxygen ↓ water	hydrogen + oxygen ⟶ water

<table>
<tr><td>6b</td><td>Hydrogen more likely to explode than petrol</td><td>Hydrogen gas is more flammable than liquid petrol</td></tr>
<tr><td>6c</td><td>125</td><td>Distance travelled = Fuel consumption x Fuel tank capacity
= 2.5 x 50
= 125 miles</td></tr>
<tr><td>7a(i)</td><td>Alloy</td><td>Alloys are mixtures of metals.
Some alloys are mixtures of metals with some non-metals.</td></tr>
<tr><td>7a(ii)</td><td>Zinc
Copper Nickel</td><td>Problem Solving: Transfer of information from table to pie chart</td></tr>
<tr><td>7b</td><td>thermoplastic</td><td><table><tr><td>thermoplastic</td><td>Plastic which reshapes on heating</td></tr><tr><td>thermosetting</td><td>Plastic which does not reshape on heating</td></tr></table></td></tr>
<tr><td>8a(i)</td><td>Dead plant material</td><td>Peat is made from the same raw materials as coal but has not been in the ground as long as coal.</td></tr>
<tr><td>8a(ii)</td><td>Will run out if overused</td><td>Finite materials will run out if they are used too much.</td></tr>
<tr><td>8b(i)</td><td>increases</td><td>Problem Solving: drawing conclusions from data in table</td></tr>
<tr><td>8b(ii)</td><td>ethane</td><td>Problem Solving: data retrieval from 2 sources of information</td></tr>
<tr><td>9a</td><td>Greenhouse Effect</td><td>The Greenhouse Effect is also known as Climate Change and Global Worming</td></tr>
<tr><td>9b</td><td>One answer from:</td><td><table><tr><td>more fossil fuels being burned</td><td>less trees to remove CO_2 by photosynthesis</td></tr></table></td></tr>
<tr><td>9c</td><td>glucose
oxygen</td><td>carbon dioxide + water $\xrightarrow[\text{light}]{\text{chlorophyll}}$ glucose + oxygen</td></tr>
<tr><td>10a(i)</td><td>Energy</td><td><table><tr><td>Food Type</td><td>Protein</td><td>Carbohydrate</td><td>Fat</td><td>Fibre</td></tr><tr><td>Use in Body</td><td>growth and repair of body tissues</td><td>energy</td><td>energy</td><td>keeps gut working properly and prevents constipation</td></tr></table></td></tr>
<tr><td>10a(ii)</td><td>Increases cholesterol levels</td><td>Saturated fat can cause cholesterol levels to rise. This can lead to heart disease.</td></tr>
<tr><td>10b</td><td>Iodine solution</td><td>Iodine solution turns blue/black when starch is present.</td></tr>
<tr><td>10c(i)</td><td>Higher the temperature, faster the reaction</td><td>Problem Solving: Forming a conclusion from table of information.</td></tr>
<tr><td>10c(ii)</td><td>~50seconds</td><td><table><tr><td>Temperature</td><td>50°C</td><td>60°C</td><td>70°C</td><td>80°C</td></tr><tr><td>Time</td><td>118s</td><td>64s</td><td>37s</td><td>18s</td></tr><tr><td>halfway</td><td></td><td>91s</td><td>50.5s</td><td>27.5s</td><td></td></tr></table>65°C will be somewhere around half way between 60°C and 70°C = ~50seconds</td></tr>
<tr><td>10c(iii)</td><td>blue → brick red</td><td>Benedict's solution turns brick red (orange) in the presence of glucose, fructose and maltose (not sucrose)</td></tr>
<tr><td>11a</td><td>2.1</td><td>Units of alcohol = $\frac{\text{Volume in cm}^3 \text{ x percentage alcohol}}{1000} = \frac{175 \text{ x } 12}{1000} = 2.1$</td></tr>
<tr><td>11b</td><td>3</td><td>One unit of alcohol takes 1 hour to break down in body
∴ 3 units of alcohol take 3 hours to break down in body.</td></tr>
<tr><td>11c</td><td>bar chart containing:</td><td><table><tr><td>½mark
vertical scale</td><td>½mark
correct labelling of bars</td><td>1mark
bars drawn correctly</td></tr></table></td></tr>
<tr><td>11d</td><td>One from:</td><td><table><tr><td>Flavourings</td><td>Vitamins & Minerals</td><td>Colourings</td></tr></table></td></tr>
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