Past Papers Int 1 Chemistry

2010 Marking Scheme

Grade Awarded	Mark Required (/60)	Mark Required %	% candidates achieving grade
A	41+	68%	31.3%
B	36+	60%	23.6%
C	31+	52%	20.1%
D	28+	47%	9.1%
No award	<28	<47%	16.0%

Section:	Multiple Choice	Extended Answer
Average Mark:	13.0 /20	23.4 /40

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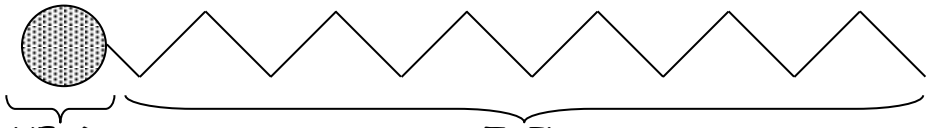
MC Qu	Answer	% Pupils Correct	Reasoning
1	B	74	☒A argon is in group 0 ∴ argon has different chemical properties to group 7 chlorine ☑B chlorine and iodine are both in group 7 and have the same chemical properties ☒C oxygen is in group 6 ∴ oxygen has different chemical properties to group 7 chlorine ☒D sulphur is in group 6 ∴ sulphur has different chemical properties to group 7 chlorine
2	D	83	A catalyst speeds up a reaction with out be used up in the reaction
3	C	55	☒A NO is the formula of nitrogen monoxide ☒B NO_2 is he formula of nitrogen dioxide ☑C N_2O is the formula of dinitrogen monoxide ☒D N_2O_4 is the formula of dinitrogen tetroxide mono- 1 / di- 2 / tri- 3 / tetra- 4
4	A	41	☑A soap is an household alkali ☒B vinegar is a household acid ☒C lemonade is a household acid ☒D soda water is a household acid
5	D	77	Acidic pH<7 / Neutral pH=7 / Alkaline pH>7
6	A	72	Higher in electrochemical series: Magnesium (Highest Voltage with Copper) → Zinc → Iron → Lower in electrochemical series: Copper (Copper with copper produces no voltage) Decreasing voltage
7	D	59	 HEAD: soluble in water TAIL: Soluble in oil/grease
8	A	67	Hard water forms scum with cleaning chemicals. Soapless detergents should be used in hard water to avoid formation of scum
9	D	90	Essential Property: Firefighters need flame-proof uniforms / Firefighters need water-proof uniforms Less Important Property: Firefighters don't need stain-proof uniforms / Firefighters don't need dyed uniforms
10	B	63	☒A Biogas is the methane formed from decaying biological material ☑B Ethanol is made by the fermentation of sugars ☒C Hydrogen can be made from water or natural gas ☒D Petrol is a fossil fuel made by distillation of crude oil
11	B	17	Coal is mainly made of carbon. There are impurities of sulphur in coal which forms sulphur dioxide when burned.
12	A	48	☑A Wire cables need to be flexible to be able to be fed round corners etc. ☒B Kevlar would be far too strong to used for coating wires ☒C Wires are colour coded for safety so transparent wires would be dangerous ☒D The plastic coating in wires needs to have a low melting point
13	C	81	☒A Light plastics are harder to dispose of because they blow away in the wind ☒B Buried plastics will not get to a high enough temperature to melt in the ground ☑C A biodegradable plastic will break down in the ground over a period of time

			☒D A plastic which is insoluble will remain in the ground for a long time.
14	B	77	☒A Fermentation: glucose → ethanol + carbon dioxide ☑B Photosynthesis: carbon dioxide + water → glucose + oxygen ☒C Polymerisation: small monomers join together to make a large polymer ☒D Respiration: glucose + oxygen → carbon dioxide + water
15	B	66	☒A Carbon dioxide is a gas which takes part in the greenhouse effect ☑B Trees absorb carbon dioxide for photosynthesis so cutting down trees increases CO_2 ☒C petrol is a hydrocarbon fossil fuel which burns to form carbon dioxide & water ☒D Carbon Dioxide causes more heat from the sun to be trapped on Earth
16	C	84	☒A Fungicide: Prevent plant diseases caused by bacteria or fungi ☒B Fertiliser: replace essential elements in the soil ☑C Pesticides: prevent crops being eaten by insects ☒D Herbicides: reduce the number of weeds
17	C	66	Problem Solving Question: The cross-over point for 1.70m and 80kg lies in the overweight region of the graph.
18	A	76	☑A Iron is needed to make haemoglobin in red blood cells ☒B Copper has no role in healthy blood ☒C Calcium has no role in healthy blood but is needed for healthy bones and teeth ☒D Aluminium has no role in healthy blood
19	C	75	Problem Solving Question: There was an increase in the number of drug-related deaths from 2003 → 2008
20	B	28	☒A 2 glasses of wine contains 2 units of alcohol ∴ 2 hours to break down alcohol ☑B 1 whisky contains 1 unit of alcohol ∴ 1 hour to break down alcohol ☒C 1 alcopop bottle contains 2 units of alcohol ∴ 2 hours to break down alcohol ☒D 1 pint of beer contains 2 units of alcohol ∴ 2 hours to break down alcohol

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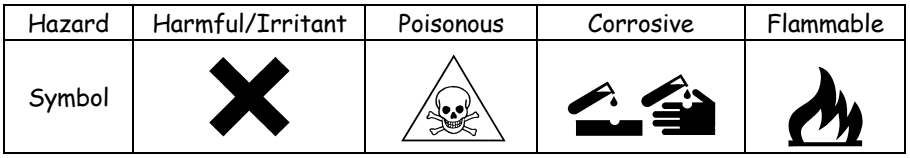
Long Qu	Answer	Reasoning
1a	Hg	Mercury has the atomic number of 80 with the symbol Hg
1b	Metal	Mercury is found to the left of the STEPS $\therefore$ mercury is a metal
1c	Thermometers or dental amalgam	P5 data booklet list the uses and properties of some metals
2a		
2b(i)	5	Total = 35 + 30 + 20 + 10 = 95 Oil-Refining = 100 = 95 = 5%
2b(ii)	paints fertilisers fibres	Problem Solving: Information transfer from table to pie chart
3a	Gas Given Off or New Substance Formed	The acetylene gas formed is a new substance and this indicates a chemical reaction has taken place.
3b	water + calcium carbide → acetylene	water + calcium carbide → acetylene + calcium hydroxide
3c	increases speed of reaction	Factors which speed up a chemical reaction: increase temperature | increase concentration | decrease particle size
4a	Growth and Repair of Body tissues	Food Type: Protein — Used by the Body for: growth and repair of body tissues Carbohydrate, Fat — energy Fibre — keeps gut working properly and prevents constipation
4b(i)	$C_3 H_9 N_1$	Problem Solving: Analysis of Molecular Diagram to work out formula.
4b(ii)	Molecule	A molecule has different atoms joined together by chemical bonds.
5a	Lead + Bromine	-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
5b	high strong	The ions inside a substance with ionic bonding are held tightly together with strong ionic bonds. These strong bonds need to be broken to melt the substance.
5c	A	A: Solids made of ions do not conduct electricity B: Liquid/Molten substances made of ions do conduct C: Solutions of substances made of ions do conduct
6a	chloride	Acid: Hydrochloric — Salt ends in: Chloride Sulphuric — Sulphate Nitric — Nitrate
6b	Burns with a "pop"	Gas: Hydrogen — Test for Gas: Burns with "pop" Oxygen — Relights glowing splint Carbon Dioxide — Turns limewater milky
6c	Gives off bubbles slower	The higher the speed of the bubble production, the more reactive the metal

<table>
<tr><td>7a</td><td>Alloy</td><td>An alloy is a mixture of metals. Alloys can have metals mixed with some non-metals.</td></tr>
<tr><td>7b</td><td>Bar chart including:</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>8a</td><td>Oxygen or air</td><td>Both water and oxygen must be present for corrosion/rusting to take place. If either water or oxygen is removed, no corrosion will take place.</td></tr>
<tr><td>8b(i)</td><td>blue</td><td>Rust indicator turns blue in the presence of rust.
The deeper the blue colour, the greater the rusting</td></tr>
<tr><td>8b(ii)</td><td>C</td><td><table><tr><td>A</td><td>Iron rusts to protect copper (iron is more reactive than copper)</td></tr><tr><td>B</td><td>Iron rusts to protect tin (iron is more reactive than tin)</td></tr><tr><td>C</td><td>Magnesium corrodes to protect iron (magnesium is more reactive than iron)</td></tr></table></td></tr>
<tr><td>9a</td><td>Oil or Natural Gas</td><td>Coal, Oil and Natural Gas are fossil fuels</td></tr>
<tr><td>9b</td><td>Dead plants/trees</td><td>Coal is formed when dead plants/trees die, get covered up by mud. With pressure over millions of years, it turns into coal</td></tr>
<tr><td>9c</td><td>Limewater turns milky</td><td><table><tr><td>Gas</td><td>Hydrogen</td><td>Oxygen</td><td>Carbon Dioxide</td></tr><tr><td>Test for Gas</td><td>Burns with “pop”</td><td>Relights glowing splint</td><td>Turns limewater milky</td></tr></table></td></tr>
<tr><td>10a</td><td>Cracking</td><td>Cracking breaks larger, less useful hydrocarbons into small, more useful hydrocarbons.</td></tr>
<tr><td>10b</td><td>Poly(ethene)</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>10c</td><td>Will reshape/melt on heating</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>11a</td><td>Phosphorus</td><td>Fertilisers are soluble compounds containing the elements:<table><tr><td>Potassium</td><td>Nitrogen</td><td>Phosphorus</td></tr></table></td></tr>
<tr><td>11b</td><td>Soluble</td><td>Fertilisers must be soluble if they are to be absorbed by a plant through the roots.</td></tr>
<tr><td>11c</td><td>bean family, clover or pea family</td><td>Leguminous plants contain nitrifying bacteria in root nodules which convert atmospheric nitrogen into nitrate compounds.
e.g. bean family, clover and pea family</td></tr>
<tr><td>12a</td><td>B → D → E → A → C</td><td>PPA Experiment method</td></tr>
<tr><td>12b</td><td>Mass of carbohydrate or distance between tube & spoon</td><td>PPA Technique question</td></tr>
<tr><td>13a(i)</td><td>26</td><td>Problem Solving: Information Gathering from a bar graph</td></tr>
<tr><td>13a(ii)</td><td>Glucose or sucrose</td><td>There are may sugars that could be the correct answer but sucrose is table sugar and glucose could be used.</td></tr>
<tr><td>13b</td><td>Heart Disease or Heart Attack</td><td>Heart Disease can be caused by a fatty diet and high cholesterol. The arteries in the heart get blocked up with fatty deposited and the heart muscle is damaged by the lack of oxygen.</td></tr>
<tr><td>14a(i)</td><td>Medicine is big enough to form tablet</td><td>The active ingredient in a tablet is often in a very small quantity and adding other chemicals bulks this out to a size where a tablet can be formed</td></tr>
<tr><td>14a(ii)</td><td>10</td><td>$\text{Percentage Ibuprofen} = \frac{\text{Mass of Ibuprofen}}{\text{Mass of Paineeze}} \times 100 = \frac{1}{10} \times 100 = 10$</td></tr>
<tr><td>14b</td><td>Antibiotic</td><td>Anti-biotic drugs kill micro-organisms like bacteria.</td></tr>
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