Past Papers Int 1 Chemistry

2012 Marking Scheme

Grade Awarded	Mark Required (/60)	Mark Required %	% candidates achieving grade
A	42+	70%	23.7%
B	36+	60%	26.8%
C	30+	50%	26.1%
D	27+	45%	9.3%
No award	<27	<45%	14.1%

Section:	Multiple Choice	Extended Answer
Average Mark:	11.9 /20	23.7 /40

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MC Qu	Answer	% Pupils Correct	Reasoning
1	D	76	☒A A gas being produced is a sign of a chemical reaction has taken place ☒B A precipitate being produced is a sign of a chemical reaction has taken place ☒C A colour change taking place is a sign of a chemical reaction has taken place ☑D In every chemical reaction a new substance is <u>always</u> formed
2	A	60	☑A Catalysts speed up reactions and same mass of catalyst left at end of reaction ☒B Catalysts speed up chemical reactions but are not used up in a reaction ☒C Same mass of catalyst will be left at the end of the reaction. ☒D Catalysts speed up chemical reactions but are not used up in a reaction
3	B	54	☒A Atoms inside molecules are held together by strong bonds ☑B Atoms inside molecules are held together by strong bonds ☒C Ions have charged particles but substance shown has no charges on it ☒D Ions have charged particles but substance shown has no charges on it
4	C	61	☒A Compound 2 cannot be ionic as it does not conduct when molten. ☒B Compound 4 cannot be ionic as it does not conduct when molten. ☑C Compounds 1 and 3 both conduct when molten ∴ they are ionic ☒D Compounds 2 and 4 cannot be ionic as they do not conduct when molten.
5	D	43	☒A N_2O_3 is the formula of dinitrogen trioxide ☒B N_2O is the formula of dinitrogen oxide ☑C NO_2 is he formula of nitrogen dioxide ☒D N_2O_4 is the formula of dinitrogen tetroxide mono- 1 / di- 2 / tri- 3 / tetra- 4
6	B	81	☒A Benedict's solution is used to test for glucose ☑B Universal indicator 9s used to test the pH of acids and alkalis ☒C Iodine solution is used to test for starch ☒D Limewater is used to test for carbon dioxide
7	C	51	☒A Soapless detergents do not form a scum with hard water ☒B Soapless detergents do not form a scum with hard water ☑C Soapless detergents form a lather with hard water without any scum formed ☒D Soapless detergents do not form a scum with hard water
8	D	67	☒A cracking is a process where large hydrocarbons are cracked into smaller ones ☒B cleaning chemicals are designed to work at lower temperatures than boiling ☒C Oil and grease have no pH and cannot be neutralised ☑D Cleaning chemicals must break oil and grease into small droplets during cleaning
9	A	79	<table><tr><th>Synthetic</th><th>Natural</th></tr><tr><td>polyester</td><td>silk</td></tr><tr><td>nylon</td><td>cotton</td></tr></table>
10	B	62	Nightdresses must be flameproof so that they do catch fire while they are being worn. Stainproofing, waterproofing and hardwearing are desirable properties but not essential like flameproofing.
11	A	49	☑A Combustion (burning) uses up oxygen during the chemical reaction ☒B Neutralisation is the reaction of acids and alkalis and oxygen is not used up ☒C Photosynthesis produces oxygen and glucose from carbon dioxide and water ☒D Polymerisation is the joining up of monomers into a polymer (no oxygen required)
12	D	62	☒A Hydrogen and oxygen would react to form harmless water as a product ☒B Hydrogen would react to form harmless water as a product (water is unchanged) ☒C Nitrogen and water would react in a car engine ☑D Nitrogen and oxygen use the spark in engines to form harmful nitrogen dioxide

13	A	30	☑A Styrene is the monomer which polymerises to form the polymer poly(styrene) ☒B Perspex is a polymer used as a replacement for glass ☒C Kevlar is a polymer used as bullet-proof vests ☒D Bakelite is a polymer used in plugs and sockets
14	C	55	☒A Water does not mix with the fuel and does not soak it up ☒B Water does not form a layer on top of the fuel and can't stop oxygen getting in ☑C Water absorbs the heat in a fire to lowers the temperature to put out the fire ☒D water does not produce carbon dioxide when added to a fire
15	B	46	☒A Pesticides are designed to be toxic to pests like insects, etc ☑B Herbicides, not pesticides, are designed to kill weeds ☒C Pesticides can be used to control pests like insect numbers ☒D Pesticides will improve crop yield if pests like insects are reduced in numbers.
16	B	37	☒A The bean family is leguminous and has root nodules to fix nitrogen from air ☑B Carrots lack the root nodules needed to fix nitrogen from air into nitrates ☒C Clover is leguminous and has root nodules to fix nitrogen from air ☒D The pea family is leguminous and has root nodules to fix nitrogen from air
17	D	79	☒A more vegetables are eaten in 2008 than in 1998 ☒B more vegetables are eaten in 2008 than in 1998 ☒C more fruit is eaten in 2008 than in 1998 ☑D more vegetables and more fruit are eaten in 2008 than in 1998
18	C	73	☒A Graph must have a peak at 37°C as enzymes work best at 37°C ☒B Graph must have a peak at 37°C as enzymes work best at 37°C ☑C Speed of reaction increases until 37°C and then the speed decreases above 37°C ☒D Graph must have a peak at 37°C as enzymes work best at 37°C
19	C	46	☒A Alcoholic drinks with concentration below 16% are made by fermentation alone ☒B Alcoholic drinks with concentration below 16% are made by fermentation alone ☑C Alcoholic drinks with concentration above 16% are made by fermentation then distillation ☒D Alcoholic drinks with concentration below 16% are made by fermentation alone
20	A	82	☑A drugs alter the way that our body works ☒B many drugs help us get well after illness ☒C Many drugs are medicines which are beneficial to the body when we are unwell ☒D Many drugs are medicines which are legal

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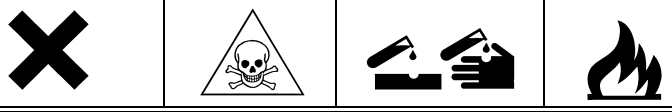
Long Qu	Answer	Reasoning
1a	lithium, carbon and oxygen	-ide: Compound contains the two named elements -ate: Compound contains 3 elements (two named elements + oxygen) -ite: Compound contains 3 elements (two named elements + oxygen) NB metal always comes first in name
1b	magnesium + oxygen → magnesium oxide	magnesium + oxygen → magnesium oxide reactants (present at start of reaction) → products (formed during reaction)
2a	Metal Liquid	Mercury is a metal on the left of the Periodic Table. Mercury is a liquid at room temperature
2b	toxic/poisonous	Hazard: Harmful/Irritant; Poisonous; Corrosive; Flammable Symbol: 
2c	0.1	$\text{Level} = \frac{\text{mass}}{\text{Volume}} = \frac{4\text{mg}}{40\text{m}^3} = 0.1$ milligrams per m^3
3a	Lemonade; Baking Soda Vinegar; Bleach	Acids have a pH less than 7 and include fizzy drinks and vinegar Alkalis have a pH greater than 7 and include baking soda and Bleach
3b(i)	Chloride	hydrochloric acid + calcium carbonate → calcium chloride + water + carbon dioxide
3b(ii)	pH increases	pH of an acid is below 7 and when a metal carbonate is added, the acid is neutralised and pH increases until it reaches pH=7
4a	reshapes/melts on heating	thermoplastic: Plastic which reshapes on heating thermosetting: Plastic which does not reshape on heating
4b	Si	Each element has its own Name, Symbol and atomic number.
4c	Low density	Problem Solving: Selection of information from data booklet
5a	Lime water	Lime water turns milky in the presence of carbon dioxide
5b	Decrease in time taken	Factors which increase rate of a chemical reaction: Increase in temperature; Increase in concentration; Decrease in Particle Size
5c	One answer from:	Keeps the body healthy; Keep body working properly; Body functions better/properly Prevents diseases; Healthy body growth; Helps immune system
6a	Weakens bridge or decreases strength	Rusting will weaken the strength of a bridge due to iron in the bridge being slowly rusted away and less and less iron will be available to hold the structure together.
6b	One from:	Painting; Electroplating; Galvanising/zinc coating Oiling; Tin-plating; Sacrificial protection Greasing; Plastic-coating; Attach to a more reactive metal Dip coating; Attach magnesium; Coat it with a substance that is waterproof
6c	Salt/ions present	The ions in a salt speed up corrosion as they help to complete circuit
6d	Zinc, Aluminium or magnesium	Only a more reactive metal than iron will sacrificially protect iron. (Potassium, Sodium, Lithium and Calcium cannot be used as they would react with the water)

<table>
<tr><td>7a</td><td>one answer from:</td><td><table>
<tr><td>To place the metals in order of reactivity/corrosion</td><td>To find out how reactive the metals are</td></tr>
<tr><td>To find out the reactivity of zinc, magnesium and copper</td><td>To see which metals corrode fastest</td></tr>
<tr><td>To see which metals react with acid and which don't</td><td>To see what/how metals react with acid</td></tr>
</table></td></tr>
<tr><td>7b</td><td>one factor from:</td><td><table>
<tr><td>Concentration</td><td>Size/length of metal</td><td>Type of acid</td></tr>
<tr><td>Temperature</td><td>Mass/weight</td><td>Amount of time (in acid)</td></tr>
</table></td></tr>
<tr><td>7c</td><td>hydrogen</td><td>hydrochloric acid + zinc → zinc chloride + hydrogen</td></tr>
<tr><td>8a</td><td>one answer from:</td><td>They can be replaced/re-made/re-created/
more can be made quickly/reproduced</td></tr>
<tr><td>8b</td><td>carbon dioxide
And water</td><td>Hydrocarbons are compounds containing the elements carbon and hydrogen only. Burning hydrocarbons in a plentiful supply of air will form carbon dioxide and water.</td></tr>
<tr><td>8c</td><td>other gases
nitrogen
methane
carbon dioxide</td><td>Problem Solving: Information transfer from table to pie chart</td></tr>
<tr><td>9a</td><td>carbon dioxide and water</td><td>carbon dioxide + water → glucose + oxygen</td></tr>
<tr><td>9b(i)</td><td>increases & decreases
or
decreases & increases</td><td>The distance from the lamp is inversely proportional to the number of bubbles of oxygen in one minute.</td></tr>
<tr><td>9b(ii)</td><td>0, 1, 2 or 3</td><td>As 4 bubbles are formed at 100cm, less than 4 bubbles must be formed at a greater distance</td></tr>
<tr><td>9b(iii)</td><td>Measuring cylinder</td><td>Also accepted: Syringe, tube, beaker or burette</td></tr>
<tr><td>9c</td><td>relights a glowing splint</td><td>Oxygen is the only gas which relights a glowing splint</td></tr>
<tr><td>10a</td><td>D</td><td>Nitrates are absorbed into plants through the roots</td></tr>
<tr><td>10b</td><td>Reduces nitrate levels in soil</td><td>The harvesting of crops prevents the return of nitrogen compounds to the soil as the dead material breaks down.</td></tr>
<tr><td>10c</td><td>Calcium phosphate is insoluble</td><td>Only soluble compounds containing potassium, nitrogen and phosphorus can be used as fertilisers.</td></tr>
<tr><td>10d</td><td>One answer from:</td><td><table>
<tr><td>Leave water lifeless</td><td>Reduces oxygen levels in water</td><td>Algae bloom</td></tr>
<tr><td>Contaminates wildlife</td><td>Kills/harms fish/animals</td><td>Poisons water/lakes</td></tr>
</table></td></tr>
<tr><td>11a</td><td>growth and repair</td><td>Other acceptable answers:<table>
<tr><td>for growth</td><td>for repair/heal</td><td>repair damaged tissues/muscles</td></tr>
<tr><td>tissue</td><td>muscles</td><td>mending tissues/heal wounds</td></tr>
</table></td></tr>
<tr><td>11b</td><td>contains more protein</td><td>Problem Solving: Selecting information from table and making conclusion.</td></tr>
<tr><td>11c</td><td>2 5 1 2</td><td>$C_2H_5NO_2$ is the formula of glycine (1 gets dropped from formula)</td></tr>
</table>

12a	Bar Graph Showing:	½ mark: Ethanol content and (%) label ½ mark: Scale on ethanol content axis ½ mark: Bars labelled (x-axis label not required) ½ mark: Correct height of bars Allow ½ box tolerance in plotting Allow 1 plotting error Allow abbreviations for mouthwash names - ½ mark for using less than ½ graph paper Max of 1 mark if line graph plotted – ethanol content (%) label and bars labelled Allow different widths of bars
12b	Toxic or poisonous	Methanol is a toxic alcohol which can cause blindness or death. It is added to methylated spirits to prevent drinking.
12c	Strengthens teeth	Fluoride in mouthwash or toothpaste can help prevent tooth decay by strengthening the tooth.