Past Papers Int 1 Chemistry

2004 Marking Scheme

Grade Awarded	Mark Required (/60)		% candidates achieving grade
A	42+	70%	15.2%
B	35+	58%	18.0%
C	29+	48%	21.5%
D	26+	43%	8.8%
No award	<26	<43%	36.5%

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MC Qu	Answer	% Pupils Correct	Reasoning
1	A	61	Elements in the same column of the Periodic Table have the same chemical properties
2	C	69	Only iron has a melting point above 1000 °C Metal / Melting Point Aluminium / 660°C Calcium / 842°C Iron / 1538°C Magnesium / 650°C
3	D	61	Carbon dioxide gas is dissolved in fizzy carbonated drinks
4	A	34	Air is a mixture of gases (80% nitrogen and 20% oxygen)
5	B	63	Adding water dilutes the acid: acidity decreases as more water is added pH increases as pH goes up to as acidity is increased.
6	D	79	C_2H_5OH contains: 2 carbons C (big black circles) 6 hydrogen H (small white circles) 1 oxygen O (big white circles)
7	A	30	sulphur dioxide forms acid rain when dissolved in water. Acids have a pH below 7
8	C	65	General Equation: Acid + Alkali → Salt + Water Salt must be the product that is not water.
9	B	60	Brass, solder and steel are all alloys. Lead is a pure metal/element
10	D	88	Dyeing fabrics colours the fabric for clothing
11	A	43	soap forms a scum when mixed with hard water.
12	C	58	Water is good at removing heat from a fire as the water heats up and turns into steam. All 3 from HEAT, OXYGEN and FUEL are necessary for fore to take place.
13	D	32	Complete Combustion: hydrocarbons + oxygen → carbon dioxide + water Incomplete combustion produces carbon monoxide and soot(carbon) when there is a low supply of oxygen available.
14	B	42	bacteria in soil break down materials that are biodegradable
15	D	51	Photosynthesis: carbon dioxide + water → glucose + oxygen
16	C	94	Problem Solving Question: Information in a Table.

<table>
<tr><td>17</td><td>B</td><td>71</td><td>CO_2 is responsible for the Greenhouse Effect, also known as Global Warming or Climate Change. This is where the planet is becoming warmer.</td></tr>
<tr><td>18</td><td>C</td><td>79</td><td>Enzymes are designed to work best at body temperature (37°C)</td></tr>
<tr><td>19</td><td>B</td><td>87</td><td>Peanuts contain more fat than carbohydrate
<table>
<tr><td>Bread</td><td>55% carbohydrate</td><td>2% fat</td><td>8% protein</td></tr>
<tr><td>Peanuts</td><td>9% carbohydrate</td><td>49% fat</td><td>28% protein</td></tr>
<tr><td>Rice</td><td>87% carbohydrate</td><td>1% fat</td><td>6% protein</td></tr>
<tr><td>Spaghetti</td><td>84% carbohydrate</td><td>1% fat</td><td>10% protein</td></tr>
</table></td></tr>
<tr><td>20</td><td>A</td><td>61</td><td>Most dilute solution will have lowest mass /volume of water ratio
A – 1g /200cm^3 → 0.005g/cm^3 [0.005 g/cm^3 is the most dilute]
B – 2g /100cm^3→ 0.02 g/cm^3
C – 10g /1000cm^3→ 0.01 g/cm^3
D – 20g /2000cm^3→ 0.01 g/cm^3</td></tr>
</table>

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Long Qu	Answer	Reasoning
1	atoms: Ne, Mg; ions: Na^+, Cl^-; molecules: CH_4, Br_2	Atoms: Ne and Mg are both single atoms as the formula has no numbers Ions: Na^+ and Cl^- are ions as they have charges Molecules: CH_4 and Br_2 are both molecules as they are atoms joined together by chemical bonds
2a	battery and bulb/buzzer/ammeter	Battery: electrical circuits needs a power source Bulb/Buzzer/Ammeter: output device to show whether electricity is flowing
2b	metal | conductor	Metal: Strontium is on the left hand side of the STEPS on the Periodic Table. Conductor: All metals are conductors of electricity
3a	will eventually run out	Fossil Fuels (coal, oil and natural gas) are finite resources and cannot be replaced when they are used up as they take millions of years to form.
3b	kills fish/birds/animals or covers beaches in oil	oil spilt from an oil tanker causes so much damage because the crude lies on top of water affecting marine life and can wash up on beaches.
3c(i)	carbon & hydrogen	hydrocarbons: compounds containing only carbon and hydrogen
3c(ii)	distillation	Distillation separates crude oil in fractions with different boiling points.
4a	concentration	Adding water to acid dilutes the acid. This lowers the concentration of the acid.
4b	speeds up reaction	Magnesium powder has a lower particle size than magnesium ribbon. The smaller the particle size, the faster the reaction.
4c	oxygen	magnesium sulphate: magnesium + sulphur + oxygen -IDE: contains two named elements -ATE: contains the two named element & oxygen.
5a	Peas/clover/ bean/legume plants	Root nodules in certain plants contain bacteria which make nitrogen from the atmosphere and turns it into nitrogen compounds which the plant can use.
5b	Soluble in water	All fertilisers must be soluble in water Nitrate compounds are soluble in water.
6a	Graph drawn with:	½mark – x-axis labelled temperature ½mark – correct scaling on x-axis (must use at least 50% of graph paper) ½mark – points plotted correctly (1 error allowed) ½mark – points joined
6b	54-58	Problem Solving Question: reading data from graph
7a	Neutralisation	Neutralisation reactions are when acids react with other substances and the pH of the solution increases towards 7 during neutralisation of an acid.
7b(i)	Diagram showing:	Delivery tube extended into a test tube containing lime water. Tube must be below surface of limewater so gas bubbles through limewater. Liquid must be labelled limewater
7b(ii)	limewater turns milky	Test for carbon dioxide: CO_2 turns limewater milky
8a	for body growth and repair	Proteins: needed for body growth and repair Carbohydrates: Provide energy for body Fats: provide energy for body
8b	Nitrogen	Proteins contain the elements carbon, hydrogen, oxygen and nitrogen Carbohydrates and fats contain the elements carbon, hydrogen and oxygen
8c	turns blue or purple	Alkaline gas is released when protein is heated with soda lime. Alkaline gas turns damp pH paper blue or purple indicating alkali is formed
9a	brandy | wine | whisky | beer	Problem Solving Question: Finding information from a written passage

9b	fermentation	Fermentation: glucose → ethanol + carbon dioxide carbohydrate alcohol
9c	5 hours	1 unit of alcohol takes 1 hour to break down 2 pints of beer contain 4 units of alcohol → 4 hours to break down 1 measure of whisky contains 1 unit of alcohol → 1 hour to break down
9d	colouring or a bad taste	Methylated spirits contain the followings chemicals to discourage its drinking methanol: toxic chemical which can kill you colouring: purple colour make meths look unlike alcoholic drink bad taste: meths contains a really bad taste which cann't be missed when drinking
10a(i)	Zinc + Steam → Zinc Oxide + Hydrogen	
10a(ii)	hydrogen does not dissolve in water	Hydrogen gas in insoluble in water so it collects in the test tube
10a(iii)	burns with a pop	Test for Hydrogen: hydrogen gas burns with a 'pop'
10b	increased speed of reaction	Magnesium is more reactive than zinc (p6 of data booklet) Magnesium would react faster with steam than zinc would.
11a	Sugars - soluble or sweet Starch-insoluble or not sweet	Sugars are small molecules which are sweet and soluble Starch has large molecules which are not sweet and is insoluble
11b(i)	test tubes must be heated	Benedict's solution turns orange/brick red in the presence of glucose only when heated (usually placed in hot water)
11b(ii)	turns orange/red	Benedict's Solution: Turn blue→ orange/brick red in the presence of sugars (glucose, fructose, maltose but not sucrose)
11c(i)	carbon dioxide	Respiration: glucose + oxygen → carbon dioxide + water
11c(ii)	provides energy or warmth	Respiration provides the body with energy for movement and warmth
12a	Answer contains:	½mark – put salt water and rust indicator into each beaker ½mark – Put iron wire into one beaker ½mark – put plastic-coated wire into other beaker ½mark – Rust indicator will turn blue in the beaker with the iron wire bit not in the beaker with the plastic-coated wire
12b(i)	ethene	Monomers join up to make polymers during polymerisation e.g. ethene → poly(ethene)
12b(ii)	thermoplastic	thermoplastic: plastics which reshape on heating thermosetting: plastics which do not reshape on heating