



JABchem



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Past Papers Int 1 Chemistry

2006 Marking Scheme

Grade Awarded	Mark Required		% candidates achieving grade
	(/60)	%	
A	42+	70%	17.8%
B	36+	60%	17.8%
C	30+	50%	22.4%
D	27+	45%	10.4%
No award	<27	<45%	31.6%

Section:	Multiple Choice	Extended Answer
Average Mark:	12.5 /20	23.8 /40

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MC Qu	Answer	% Pupils Correct	Reasoning
1	A	64	Elements in the same column of the Periodic Table have the same chemical properties
2	C	82	<input checked="" type="checkbox"/> A symbol means: Harmful/Irritant <input checked="" type="checkbox"/> B symbol means: Toxic/Poisonous <input checked="" type="checkbox"/> C symbol means: Corrosive <input checked="" type="checkbox"/> D symbol means: Flammable
3	C	68	In a chemical reaction, a new substance is <i>always</i> formed. Four different ways to spot a chemical reaction are: gas given off, colour change, solid being formed and an energy/temperature change.
4	D	80	Slowest will be <ul style="list-style-type: none"> • Zinc lumps instead of powder (larger particle size is slower) • 20°C instead of 30°C (lower temperature is slower) • all contain the same concentration of acid (1 mole per litre)
5	B	57	<input checked="" type="checkbox"/> A Atoms inside a molecule are held together by strong bonds <input checked="" type="checkbox"/> B Atoms inside a molecule are held together by strong bonds <input checked="" type="checkbox"/> C No ions in this <i>molecule</i> . <input checked="" type="checkbox"/> D No ions in this <i>molecule</i> .
6	C	76	<input checked="" type="checkbox"/> A pH=5 is an acidic pH but not all acids have an exact pH of 5 <input checked="" type="checkbox"/> B pH=7 is neutral not acidic <input checked="" type="checkbox"/> C all acids have a pH less than 7 <input checked="" type="checkbox"/> D substances with a pH above 7 are alkaline
7	B	77	<input checked="" type="checkbox"/> A Benedict's solution is used to detect presence of sugars (Unit3) <input checked="" type="checkbox"/> B Universal Indicator measures pH/acidity/alkalinity of solutions <input checked="" type="checkbox"/> C Iodine is used to detect the presence of starch (Unit3) <input checked="" type="checkbox"/> D limewater turns milky in the presence of carbon dioxide
8	A	25	<input checked="" type="checkbox"/> A Baking Soda is an alkali and will neutralise acidic bee stings <input checked="" type="checkbox"/> B Lemon Juice is an acid and cannot neutralise acidic bee stings <input checked="" type="checkbox"/> C Soda Water is an acid and cannot neutralise acidic bee stings <input checked="" type="checkbox"/> D Vinegar is an acid and cannot neutralise acidic bee stings
9	C	34	General Equation: acid + metal carbonate → salt + water + carbon dioxide Reaction: hydrochloric acid + magnesium carbonate → magnesium chloride + water + carbon dioxide
10	D	86	Metals conduct electricity so a metal coin will light the bulb. Wood, glass and plastic are all insulators so they don't bulb
11	A	61	Brass is an alloy of 2 metals (copper and zinc) Copper, gold and silver are pure metal elements and are found on the left of the STEPS on the Periodic Table
12	B	64	Hydrogen is a renewable energy source and can be made from water. Coal, Oil, Natural Gas and Peat are all non-renewable fossil fuels.

13	A	41	The fractions at the top have smaller molecules → gasoline is smaller than light gas oil The fractions at the top are more flammable → gasoline is more flammable than light gas oil																
14	C	58	<input checked="" type="checkbox"/> A Pesticides are used to control pests <input checked="" type="checkbox"/> B Fungicides are used to control bacteria and fungi <input checked="" type="checkbox"/> C fertilisers contain the essential elements N, P and K <input checked="" type="checkbox"/> D herbicides are used to control weeds																
15	D	68	Problem Solving Question																
16	D	70	The human body contains more than 60% water.																
17	C	38	Calcium is a mineral you need for healthy teeth and bones.																
18	B	53	Butter is the only answer which has a high fat content (83%) <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Bread</td> <td>55% carbohydrate</td> <td>2% fat</td> <td>8% protein</td> </tr> <tr> <td>Butter</td> <td>0% carbohydrate</td> <td>83% fat</td> <td>1% protein</td> </tr> <tr> <td>Jam</td> <td>69% carbohydrate</td> <td>0% fat</td> <td>1% protein</td> </tr> <tr> <td>Milk</td> <td>5% carbohydrate</td> <td>4% fat</td> <td>3% protein</td> </tr> </table>	Bread	55% carbohydrate	2% fat	8% protein	Butter	0% carbohydrate	83% fat	1% protein	Jam	69% carbohydrate	0% fat	1% protein	Milk	5% carbohydrate	4% fat	3% protein
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19	A	42	The Oily mark on the filter paper → fat present Iodine test staying yellow/brown → no starch present Benedict's Test staying blue → no glucose present Heating with soda lime producing Alkaline gas → protein present A is the only answer with fat and protein																
20	B	82	A drug alters the way the body works (from its normal state)																

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Long Qu	Answer	Reasoning									
1a	Mercury or Bromine	<p>Mercury and bromine are the only two elements that are liquids at room temperature (25°C). Page 3 of data booklet:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Element</th> <th style="text-align: center;">Melting Point</th> <th style="text-align: center;">Boiling Point</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Bromine</td> <td style="text-align: center;">-7 °C</td> <td style="text-align: center;">59 °C</td> </tr> <tr> <td style="text-align: center;">Mercury</td> <td style="text-align: center;">-39 °C</td> <td style="text-align: center;">357 °C</td> </tr> </tbody> </table>	Element	Melting Point	Boiling Point	Bromine	-7 °C	59 °C	Mercury	-39 °C	357 °C
Element	Melting Point	Boiling Point									
Bromine	-7 °C	59 °C									
Mercury	-39 °C	357 °C									
1b(i)	Germanium	Ge is the symbol for Germanium, atomic number 32 in data book.									
1b(ii)	Any value between 2.33 - 5.9	<p>Value must be above Silicon Si (2.33)</p> <p>Value must be below Gallium Ga (5.9) as Group 3 elements have slightly larger values than group 4 elements in the same horizontal (↔) row.</p>									
2a(i)	nitrogen = -196°C oxygen = -183°C	Values are found on page 3 of the data booklet.									
2a(ii)	gases have different boiling points	Fractional distillation separates chemicals that have different boiling points									
2b	Ar	Ar is the symbol for argon (atomic number 18)									
3a(i)	SO ₂	Di-means 2 → sulphur dioxide means 1 sulphur and 2 oxygen atoms in molecule (Mono- means 1, tri- means 3 and tetra- means 4)									
3a(ii)	acidic solution or acid rain	<p>Sulphur dioxide dissolves in water to form an acid</p> <p>Sulphur in fossil fuels burns to form sulphur dioxide which dissolves in rain water to make acid rain</p>									
3b	carbon or carbon monoxide	<p>Heating copper oxide with carbon forms copper metal and carbon dioxide gas.</p> <p>Other metals made this way include: iron, lead and tin.</p>									
3c	1.5 tonnes	1% of 150 tonnes = 1/100 × 150tonnes = 1.5tonnes									
4a	to increase the keeping quality of food	<p>other acceptable answers:</p> <p>To increase the shelf life of food or to stop food from going mouldy</p>									
4b(i)	Brown	Food Colours Chart → only the Brown sample has more than one dot produced									
4b(ii)	Green	<p>Dyes Chart → E122 dot is the highest dot</p> <p>Food Colours Chart → only the Green sample has a single dot at the same height</p>									
5a	0.3	<p>Average of 0.2 and 0.4 values from the 1st and 2nd experiments</p> <p>Average = (0.2 + 0.4) / 2. [NB. press equals button before dividing by 2]</p>									
5b	increases	The higher the no. of drops of detergent used, the higher the height of lather produced in centimetres									
5c	any one from:	<ul style="list-style-type: none"> • Temperature of water • Type of detergent used • Type/hardness of water • concentration of detergent • number of shakes • hardness of shakes 									

6a	hydrogen	General Equation: acid + metals → salt + hydrogen
6b	copper	1. No bubbles of gas produced so no reaction → copper does not react with acids 2. Fastest bubbling of gas → Magnesium is the most reactive (p6 of data book) 3. Some bubbling → Zinc reacts with acid but is less reactive than Magnesium
	magnesium	
	zinc	
6c	Different metals react at different speeds	Metals react at different speeds. See page 6 of data book for the order of reactivity of metals
6d	To prevent acid splashing into eyes	Safety Question based on PPA Practical 2.1
7a	add 100g masses onto hanger until fibre breaks	Count each 100g mass being added until the weight on the hanger breaks the fibre.
7b(i)	natural	Silk is a natural fibre not a synthetic fibre
7b(ii)	Bars labelled in following order:	Wool - Cotton - Silk - Polyester - Nylon
8a(i)	combustion or burning	hydrocarbons burn when they join up with oxygen. Combustion is the scientific word for burning.
8a(ii)	ethanol or alcohol	Fermentation: glucose → <u>ETHANOL</u> + carbon dioxide Ethanol is one type of alcohol
8b	Benedict's Test	Benedict's Solution turns orange in the presence of glucose.
9a	Photosynthesis	Photosynthesis: carbon dioxide + water → glucose and oxygen Light is required for plants to make food for themselves by photosynthesis
9b	Oxygen relights a glowing splint	Test for oxygen: Oxygen gas relights a glowing splint.
9c	Chlorophyll	Chlorophyll is the green coloured chemical in all plants where the process of photosynthesis takes place.
10a	Either answer from:	Increased burning of fossil fuels or Cutting down of rainforests/trees
10b(i)	Any answer from:	Distance of jars from heater Size of jars Same type of jars Same amount of heat
10b(ii)	5°C	carbon dioxide is Gas Jar 2 (see diagram p20 in question) At time =0minutes, Temp = 20°C At time =40minutes, Temp = 25°C Difference in temperature from 0min → 40 min for gas jar 2 = 25°C-20°C = 5°C
11a(i)	Cracking	Cracking: Less useful, large molecules are broken into more useful smaller molecules
11a(ii)	Catalyst	Catalysts speed up reactions but are not used up in the reaction.
11b	C ₂ H ₄	2 carbon atoms (C) and 4 hydrogen atoms (H) → C ₂ H ₄
11c(i)	monomers	Monomers: Small molecules which join together to make polymers by the process of polymerisation.
11c(ii)	-E-E-E-E-	Any answer which shows monomer units joined together
12a	Potassium	Essential Elements for healthy plant growth: Potassium, Nitrogen and Phosphorus
12b(i)	Add water to test tubes Add solids to different test tubes Shake test tubes	

12b(ii)	Compound must be soluble in water	All chemicals used in fertilisers must be soluble in water if they are to get into the plants through the roots of their plants.
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