# Past Papers Int 1 Chemistry

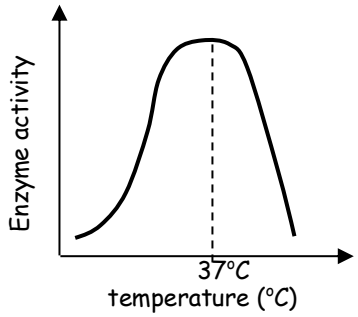
# 2007 Marking Scheme

| Grade Awarded | Mark Required (/60) | Mark Required % | % candidates achieving grade |
|---|---|---|---|
| A | 42+ | 70% | 27.7% |
| B | 37+ | 62% | 21.7% |
| C | 33+ | 55% | 17.1% |
| D | 31+ | 52% | 6.4% |
| No award | <31 | <52% | 27.1% |

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

# 2007 Int 1 Chemistry Marking Scheme

| MC Qu | Answer | % Pupils Correct | Reasoning |
|---|---|---|---|
| 1 | C | 47 | ☒A element molecule with 2 atoms joined by a chemical bond<br>☒B compound molecule with 2 different elements joined by a chemical bond<br>☑C ions in a lattice of oppositely charged particles<br>☒D compound molecule with 2 different elements joined by chemical bonds |
| 2 | B | 27 | ☒A Sulphur dioxide has the formula $SO_2$ and has 3 atoms in the molecule<br>☑B Sulphur trioxide has the formula $SO_3$ and has 4 atoms in the molecule<br>☒C Dinitrogen tetroxide has the formula $N_2O_4$ and has 6 atoms in the molecule<br>☒D Carbon monoxide has the formula $CO$ and has 2 atoms in the molecule |
| 3 | B | 76 | <table><tr><td>Compound</td><td colspan="3">Elements inside compound</td></tr><tr><td>calcium carbonate</td><td>Calcium</td><td>Carbon</td><td>Oxygen</td></tr><tr><td>sodium sulphate</td><td>Sodium</td><td>Sulphur</td><td>Oxygen</td></tr></table> |
| 4 | A | 80 | ☑A the concentration is the variable which is changing: 2,1,0.5<br>☒B the mass of magnesium remains constant (1g)<br>☒C the temperature of the acid remains constant (20°C)<br>☒D The volume of acid remains constant ($50cm^3$) |
| 5 | D | 80 | Reactants → Products<br>Chemicals which existed at the start of the reaction → Chemical formed during the reaction and are not found before the reaction starts<br>sulphuric acid + copper oxide → copper sulphate + water |
| 6 | C | 43 | <table><tr><td>At 120°C</td><td>At 113°C</td><td>At 100°C</td></tr><tr><td>temperature is above the melting point so sulphur has melted<br>∴ sulphur is a liquid</td><td>melting point of sulphur = 113°C<br>Liquid sulphur begins to change state from liquid to solid</td><td>temperature is below the melting point so sulphur has frozen<br>∴ sulphur is a solid</td></tr></table> |
| 7 | A | 75 | ☑A silk is a natural fibre made by silk worms<br>☒B nylon is a synthetic fibre<br>☒C Kevlar is a very strong synthetic fibre and used in bullet-proof vests<br>☒D Polyester is a synthetic fibre used in clothing |
| 8 | D | 75 | ☒A sand can be used to put out oil fires although it may not be the most effective<br>☒B fire blanket would put out an oil fire by cutting off the air supply to the fire<br>☒C carbon dioxide gas would put out an oil fire by cutting off the air supply<br>☑D water should not be used on oil fires as oil floats on water and fire is made worse as burning oil is sent rushing into the air |
| 9 | B | 85 | ☒A Argon is a non-flammable gas (group 0 gases are very unreactive)<br>☑B Oxygen is required for any substance to burn<br>☒C Nitrogen is a non-flammable gas<br>☒D Carbon dioxide gas is a non-flammable gas used in fire extinguishers |
| 10 | A | 48 | ☑A $C_3H_6$ is a hydrocarbon as it only contains the elements hydrogen and carbon<br>☒B $C_3H_7OH$ is not a hydrocarbon as it contains the element oxygen<br>☒C $CO_2$ is not a hydrocarbon as it contains the element oxygen<br>☒D $H_2CO_3$ is not a hydrocarbon as it contains the element oxygen |
| 11 | B | 33 | <table><tr><td>Property</td><td>Petroleum Gas</td><td>Gasoline</td><td>Kerosene</td><td>Light gas Oil</td><td>Heavy Gas Oil</td><td>Residue</td></tr><tr><td>Viscosity</td><td>Low</td><td colspan="4">←→</td><td>High</td></tr><tr><td>Evaporation</td><td>Quickly</td><td colspan="4">←→</td><td>Slowly</td></tr><tr><td>Flammability</td><td>High</td><td colspan="4">←→</td><td>Low</td></tr><tr><td>Boiling Point</td><td>Low</td><td colspan="4">←→</td><td>High</td></tr><tr><td>Molecule Size</td><td>Small</td><td colspan="4">←→</td><td>Large</td></tr></table> |

| | | | |
|---|---|---|---|
| 12 | D | 73 | ☒A Burying plastics does not produce harmful gases but the plastics last a long time<br>☒B Crushing plastic does not produce harmful gases but the plastics take up less space<br>☒C Recycling of plastics does not produce harmful gases but saves resources<br>☑D Incineration of plastics produced harmful gases e.g. carbon monoxide, hydrogen chloride |
| 13 | B | 74 | Most plastics are made from the products of the distillation of crude oil |
| 14 | A | 81 | ☑A A lightweight, non-soluble plastic is ideal for lemonade bottles<br>☒B The plastic in a lemonade bottle must not be soluble in water<br>☒C lemonade bottles are made of plastic to make them as lightweight as possible<br>☒D lemonade bottles are made of plastic to make them as lightweight as possible |
| 15 | D | 62 | ☒A fungicides are used to prevent diseases in plants<br>☒B herbicides are used to reduce weed growth to maximise crop growth<br>☒C fungicides are used to prevent diseases in plants<br>☑D natural predators are used to control pests & reduce the need to use pesticides |
| 16 | C | 81 | Enzymes are work best at body temperature (37°C) and are denatured at high temperatures<br>  |
| 17 | B | 28 | ☒A Test for fats: greasy stains on filter paper<br>☑B Test for proteins: heat with soda lime and gas given off turn moist pH paper blue<br>☒C Test for sugars: sugars (except sucrose) turn warm Benedict's solution orange/brick red<br>☒D Test for starch: iodine solution turns blue/black |
| 18 | D | 44 | <table><tr><td>Food</td><td>Banana</td><td>Butter</td><td>Carrot</td><td>Cheese</td></tr><tr><td>Protein Content (g per 100g)</td><td>1g</td><td>1g</td><td>1g</td><td>25g</td></tr></table> |
| 19 | A | 54 | ☑A Fibre keeps the gut working well and prevents constipation<br>☒B Calcium is needed for healthy teeth and bones<br>☒C Protein is needed for growth and repair<br>☒D Carbohydates and fats provide the body with energy |
| 20 | C | 86 | ☒A Colourings change the appearance of food<br>☒B Flavourings e.g. sweetners change the taste of food<br>☑C Preservatives make food keep longer and last longer<br>☒D Vitamins enhance the nutritional value of a food |

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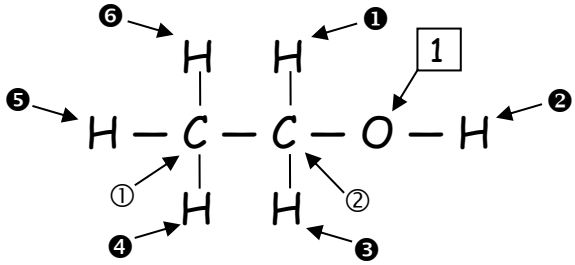
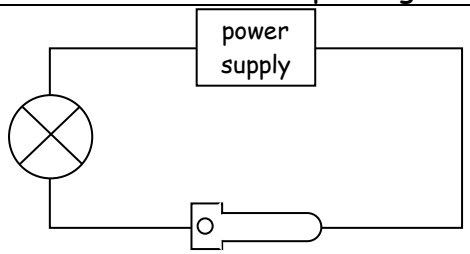
<table>
<tr><th>Long Qu</th><th>Answer</th><th>Reasoning</th></tr>
<tr><td>1a</td><td>Poisonous or toxic</td><td>
<table>
<tr><th>Hazard</th><th>Harmful/Irritant</th><th>Poisonous</th><th>Corrosive</th><th>Flammable</th></tr>
<tr><td>Symbol</td><td>  </td><td>  </td><td>  </td><td>  </td></tr>
</table>
</td></tr>
<tr><td>1b</td><td>$C_2H_6O$<br><br>or $C_2H_5OH$</td><td> 
</td></tr>
<tr><td>1c</td><td>Cannot live/manage without drug</td><td>An addiction to a drug means that the individual can't perform normally without the drug and suffer from withdrawal symptoms.</td></tr>
<tr><td>2a</td><td>Test tube B</td><td>
<table>
<tr><th>Test Tube</th><th>Reasoning</th></tr>
<tr><td>A</td><td>A physical change has taken place as there is no new substance formed (brown solid chocolate at start and end of experiment</td></tr>
<tr><td>B</td><td>A chemical reaction has taken place as a new substance (a white solid) is formed from a clear liquid</td></tr>
<tr><td>C</td><td>No change to substance so no chemical reaction has taken place</td></tr>
</table>
</td></tr>
<tr><td>2b</td><td>Strong bonds</td><td>Ions have strong bonds between the ions which gives the substance a high melting point.</td></tr>
<tr><td>3a(i)</td><td>7</td><td>Water is a neutral substance and has pH=7</td></tr>
<tr><td>3a(ii)</td><td>Match colour of solution against colour on chart. Read pH number from colour on chart</td><td>PPA Technique Question</td></tr>
<tr><td>3b</td><td>Dissolve in water</td><td>Solid substances must be dissolved in water before the pH can be taken with pH paper.</td></tr>
<tr><td>4a</td><td>Line graph showing:</td><td>½ mark – correct label on x-axis<br>½ mark – correct scale on y-axis<br>½ mark – correctly drawn points<br>½ mark – suitable line joining points</td></tr>
<tr><td>4b</td><td>-16°C ± 1°C</td><td>Problem Solving: reading information off a line graph</td></tr>
<tr><td>4c(i)</td><td>Energy</td><td>
<table>
<tr><th>Food Type</th><th>Used by the Body for</th></tr>
<tr><td>Protein</td><td>growth and repair of body tissues</td></tr>
<tr><td>Carbohydrate</td><td rowspan="2">energy</td></tr>
<tr><td>Fat</td></tr>
<tr><td>Fibre</td><td>keeps gut working properly and prevents constipation</td></tr>
</table>
</td></tr>
<tr><td>4c(ii)</td><td>Heart disease</td><td>Too much fat in the diet can lead to a heart attack as the arteries in the heart get blocked with fatty deposits</td></tr>
<tr><td>5a(i)</td><td>Sodium<br>Chlorine</td><td>Problem Solving: Transfer of information from flow chart</td></tr>
<tr><td>5a(ii)</td><td>To make ammonia/fertilisers</td><td>Problem Solving: Transfer of information from flow chart</td></tr>
</table>

| | | |
|---|---|---|
| 5b | Bacteria or germs | Chlorine is added to drinking water to kill bacteria and make the water safe to drink |
| 5c | breaks up the grease into droplets which are washed off with water | Grease/oil is removed as detergent is soluble in both water and oil. Oil droplets are formed as they get surrounded by detergent molecules which breaks up the grease. |
| 6a(i) | Diagram showing: |  |
| 6a(ii) | Bulb lights up | Conduction of electricity in the circuit would lead to the bulb lighting up. |
| 6b | thermosetting | thermoplastic: Plastic which reshapes on heating<br>thermosetting: Plastic which does not reshape on heating |
| 7a | waste gas, coke, (hot) air, lime | Problem Solving Question: Information transfer from written passage to diagram |
| 7b | 2614°C | Problem Solving: Information gathering from data booklet |
| 7c | Acid (rain) | Sulphur dioxide dissolves in water to make an acid, which will form acid rain in the atmosphere. |
| 8a | To complete the circuit | The ions in the solution move to balance out the moving charge in the circuit |
| 8b | Any metal from: tin, lead, copper, silver or gold | Magnesium + Iron in cell gives a voltage = 0.97V<br>To achieve a higher voltage, the gap between metals in the reactivity series must be greater.<br>∴ metal used must be tin, lead, copper, silver or gold |
| 8c | Chemicals have run out/been used up | The chemicals in a cell/battery will run out eventually when all the chemicals have been used up. |
| 9a | water + air or oxygen | Both air/oxygen and water are required fro rusting to occur. |
| 9b | Magnesium is more reactive than iron | As magnesium is more reactive than iron, magnesium sacrificially protects the iron. |
| 9c | One from: | Galvanise/coat in zinc<br>Cover in other more reactive metal<br>Paint, grease or coat in plastic<br>Attach to negative terminal of battery |
| 10a | Calcium | Calcium is a group 2 metal but copper and iron are in the block between group 2 and group 3 and are transition metals |
| 10b(i) | 6 | Problem Solving: interpreting a diagram |
| 10b(ii) | So fertilisers can get into plants through the roots | Fertilisers are soluble compounds containing at least one of the following elements: nitrogen, potassium or phosphorus |
| 11a | Light (sun) or chlorophyll | carbon dioxide + water $\xrightarrow[\text{light}]{\text{chlorophyll}}$ glucose + oxygen<br>$6CO_2 + 6H_2O \longrightarrow C_6H_{12}O_6 + 6O_2$ |

<table>
<tr><td>11b(i)</td><td>Polymerisation or condensation</td><td>Polymerisation reactions join small monomer molecules into large polymer molecules</td></tr>
<tr><td>11b(ii)</td><td>To store food</td><td>Plants do not store the glucose made by photosynthesis. Plants join the glucose units together to make starch for long term storage</td></tr>
<tr><td>11b(iii)</td><td>Blue/black</td><td><table><tr><th>Chemical</th><th>Tested with</th><th>Positive Test</th></tr><tr><td>Starch</td><td>iodine solution</td><td>Turns blue/black</td></tr><tr><td>Glucose</td><td>warm Benedict's solution</td><td>Turns orange/brick red</td></tr><tr><td>Protein</td><td>soda lime + heat</td><td>Damp pH paper turns blue</td></tr><tr><td>Fat</td><td>filter paper</td><td>Greasy mark on paper</td></tr></table></td></tr>
<tr><td>12a</td><td>Carbon dioxide causes the Greenhouse Effect</td><td>The Greenhouse Effect causes the atmosphere to warm up. Greenhouses gases like Carbon Dioxide help the atmosphere trap more heat from the sun.</td></tr>
<tr><td>12b</td><td>2016</td><td>Problem Solving Question: Information from a graph</td></tr>
<tr><td>12c</td><td>No carbon dioxide produced on burning or only water produced</td><td>Hydrogen burns to form water. It is a clean fuel as no carbon dioxide, carbon monoxide or carbon (soot) is formed.</td></tr>
</table>