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GCSE

Chemistry B J644

Gateway Science Suite

General Certificate of Secondary Education

Report on the Units

January 2009

J644/MS/R/09J

Oxford Cambridge and RSA Examinations

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GCSE Chemistry B (J644)

REPORT ON THE UNITS

B641/01 Unit 1: Modules C1, C2 and C3 Foundation Tier

General Comments

As in previous sessions, there were only an extremely small number of candidates entered for this component. The average mark for this examination paper was 35, and the marks achieved by the candidates ranged from 8 to 60. A small number of candidates obtained marks that suggested they would have been better suited to the Higher Tier examination rather than the Foundation Tier.

All sections of the examination paper differentiated well and allowed candidates to demonstrate their knowledge and understanding of GCSE Chemistry.

Candidates found Section B more challenging than Sections A and C.

Comments on Individual Questions

SECTION A - MODULE C1

Question 1
This question was about the chemical changes involved in cooking.

(a) Many candidates were able to correctly state a change that happens during a chemical change, such as change in colour, appearance or mass, but fewer candidates gave answers in terms of a new substance being formed or a chemical change being difficult to reverse. The most common incorrect answer involved changes of state.

(b) The word equation in part (i) was generally well known. A significant proportion of candidates however wrote sodium **hydro**carbonate instead of sodium **hydrogen**carbonate or included heat in the equation; these candidates were not awarded a mark. Heat over or under the arrow however was allowed. Candidates, who wrote a correct symbol equation, rather than a word equation, were credited. In part (ii) most candidates knew that baking powder is used to make cakes rise but the test for carbon dioxide in part (iii) was less well known. Common misconceptions were the use of a lighted or glowing splint.

Question 2
This question focussed on cosmetic products and their testing.

(a) Most candidates knew that nail varnish is insoluble in water. Although many correctly selected that nail varnish remover contains a solvent, a common distracter was solute.

(b) Almost all the candidates were able to give an appropriate reason for the thorough testing of cosmetic products before their use by people.

Question 3
This question was about making crude oil useful and carbon fuels.

(a) Many candidates were unable to recall the name of another fraction made from crude oil. Oil was a common imprecise response, which was not given credit.

(b) The fact that petrol can be separated from crude oil because it has a different boiling point was not well known.

(c) Many candidates stated that cracking makes more petrol, but weaker candidates often gave combustion as an answer.

(d) Almost all the candidates were able to interpret the data and state that hydrogen releases the most energy.

(e) Most candidates were able to state a factor to consider when choosing a fuel. Some candidates however failed to read the question carefully and gave energy as an answer.

Question 4
This question involved the interpretation of formulae and was the least demanding question in Section A.

(a) The majority of candidates deduced that D contained 11 atoms.

(b) The majority of candidates deduced that C had the formula C_4H_8.

(c) The names of the elements in a hydrocarbon were known by the majority of candidates. The most common error was hydrogen and carbon dioxide.

Question 5
This question was about polymers.

(a) Although this question was aimed at grades F and G, many candidates were unable to state the name of an addition polymer given the name of the monomer and vice versa.

(b) This question proved to be the most demanding question in Section A and a significant proportion of candidates did not attempt it. Many candidates thought that a monomer mixes with a polymer during polymerisation and heat, hot or high temperature was frequently seen as a condition for the reaction. Imprecise references to pressure did not gain credit.

SECTION B - MODULE C2

Question 6
This question about the Earth was the least demanding question in Section B.

(a) Most candidates were able to label the layers of the Earth. The most common misconception was limestone instead of the mantle.

(b) Many candidates knew that molten rock below the Earth's surface is called magma.

(c) Although this question was aimed at grade F, many candidates could not suggest a reason why people choose to live near a volcano. Vague answers such as 'it is warm' or 'there is a nice view' did not gain credit.

Question 7
This question about alloys was the most demanding question on the whole examination paper.

(a) Only a small proportion of candidates were able to describe an alloy as a mixture containing a metal. A frequent misconception was that an alloy contains metals joined or bonded together and a significant number of candidates wrote about alloy wheels.

(b) Only an extremely small proportion of candidates could name the two main metals in solder with the majority of candidates scoring zero for this question.

(c) A significant number of candidates did not attempt this question and only a minority were able to describe a use of amalgam.

(d) Many candidates scored only this mark in question 7. The most common correct responses were door knobs and instruments.

Question 8
This question was about rates of reaction.

(a) Most candidates deduced that the reaction finished between 4 and 4.5 minutes. A significant number however suggested 7 – 7.5 minutes at the end of the x-axis.

(b) Most candidates scored at least 1 mark for sketching the results of carrying out the reaction using a catalyst. Weaker candidates often failed to appreciate that the volume of gas produced at the end of the reaction would be the same as for the uncatalysed reaction.

(c) Only a very small proportion of candidates could explain why the reaction would be faster using zinc powder rather than zinc lumps. Simply stating that the zinc was in smaller pieces was insufficient. The mark was given for increased surface area or the idea of more collisions between particles.

(d) Surprisingly, many candidates were unable to describe another way to make the reaction go faster. A large number talked about adding more zinc or adding more acid. Candidates who answered this question correctly usually talked about heating or stirring.

Question 9
This question focussed on paints.

(a) Most candidates could state at least one reason why we use paint and many described both decoration and protection.

(b) Phosphorescent and thermochromic pigments were well known by the majority of candidates.

(c) The function of the solvent in thinning the paint or dissolving the binding medium or pigment was not well known. Many candidates suggested that the solvent helps to stick the paint to the wall.

SECTION C - MODULE C3

Question 10
This question focussed on physical properties of substances and was the least demanding question on the whole examination paper, with most candidates gaining 3 marks.

Question 11
This question was about the elements in Group 7.

(a) Most candidates were able to name another element in Group 7, although some candidates wrote chlorine or iodine which were given in the stem of the question.

(b) Many candidates did not know that bromine is a liquid at room temperature.

(c) Many candidates did not know that iodine is used to sterilise cuts and wounds. Fluorine or chlorine was often given as an answer.

(d) Most candidates correctly identified the name of the product from the symbol equation.

(e) Displacement reactions were not well understood. Iodide or potassium chlorine was often given as a product, as were water and carbon dioxide.

Question 12
This question was about atomic structure.

(a) Most candidates correctly counted that there were 14 electrons in part (i). In part (ii) many candidates correctly stated the charge on an electron.

(b) In part (i) only the most able candidates were able to name the particles in the nucleus. The electrical charge on the nucleus in part (ii) was even less well known.

(c) Candidates still confuse groups and periods, with 3 being a common misconception. Some candidates named the element (silicon) rather than stating which group of the Periodic Table the element is in.

Question 13
This question focussed on the properties of metals.

(a) Almost all candidates correctly interpreted the data and identified zinc as the metal with the lowest density.

(b) Most candidates could state the relative thermal conductivity of cobalt.

(c) Many candidates stated most or all of the properties of copper from the table, expecting the Examiner to choose which property made copper the most suitable metal for making electrical wires. These candidates did not gain credit. It was not sufficient to simply state that copper is a good conductor since the table gave data about electrical and thermal conductivity.

Question 14
This question was about the electrolysis of dilute sulfuric acid and was the most demanding question in Section C.

(a) Many candidates correctly selected an anion from the list of particles given.

(b) Few candidates correctly stated that gas X was oxygen. Marks were most often awarded for the test for hydrogen. If gas X was incorrectly named, a mark was given for a correct test for the gas stated. Some candidates did not gain credit as they talked simply about using a splint, without stating whether the splint was lit or glowing.

B641/02 Unit 1: Modules C1, C2 and C3 Higher Tier

General Comments

A range of marks were achieved by candidates taking the paper, with the majority scoring between 25 and 45 marks. There were a small number of high scoring papers (i.e. over 50) indicating the paper was able to differentiate the most able candidates. Few candidates scored low marks indicating that the majority of Centres had entered candidates for the correct tier.

The large majority of candidates had attempted all questions on the paper, with a very low number of 'No Responses' seen.

There were examples of instances where pupils appear to have not read the question thoroughly and have either failed to use the information provided or have stated the exact opposite of the information presented in the question. For example, in question 5b, many pupils stated bond making takes in heat. In other cases where pupils were asked to provide other factors they merely repeated one of those given in the question. Some candidates gave symbol equations when asked for word equations and some gave word equations when asked for symbol equations.

A number of candidates appeared to be unaware of the difference between atoms, ions and molecules while significant numbers appear to find these words unnecessary, e.g. referring to water rather than water molecules.

The term "intermolecular" seems to be very well known but many referred to the intermolecular forces between atoms/ions.

There were a few instances where a candidate may well have benefited from the use of an amanuensis.

Comments on Individual Questions

SECTION A - MODULE C1

Question 1

(a) Most candidates were able to complete the word equation but a significant number of candidates wrote sodium hydrocarbonate instead of sodium hydrogen carbonate. Sodium hydroxide was also frequently given as a product.

(b) The test for carbon dioxide was generally well known by the candidates. A few described the test as putting out a lighted splint and other candidates confused hydrogen for carbon dioxide. A few indicated that the gas makes the cake rise.

Question 2

(a) The majority of candidates compared the strengths of intermolecular bonds between water molecules and those between nail varnish molecules rather than between nail varnish molecules and water molecules. Significant numbers of candidates failed to refer to molecules or particles.

(b) Generally well answered but a number of candidates appeared to misinterpret this question, thinking that they were being asked why cosmetics should be tested before being sold.

Question 3

(a) Parts (i) and (ii) were generally well answered.

(b) It was pleasing to see a large number of correctly balanced equations. Candidates appear to have taken on board previous comments made by Examiners in that few typological errors were made in the formulae e.g. CO2.

Question 4

(a) Part (i) was found to be the easiest question on the paper. Part (ii) was well answered but too many candidates failed to say only single bonds.

(b) Clear, discoloured and turns black were frequently see as incorrect responses.

(c) Candidates found this question difficult, few achieving 2 marks. High temperature and vague references to pressure were popular answers. The expected answers were high pressure and a catalyst.

Question 5

(a) The question did not discriminate well as many candidates gave 42 as the answer to the calculation, not 4200.

(b) Only candidates at the level of A* were successful in their attempts to correctly answer this question. Many candidates repeated the stem of the question relating to bond making. Many answers contained references to bond making being endothermic / taking heat in, others followed the form of 'heat given out when bonds break whilst heat is taken in when new bonds are made'. Few candidates compared energy in with energy out.

SECTION B - MODULE C2

Question 6

(a) The majority of candidates were able to complete the word equation.

(b) Virtually every candidate was able to interpret the graph and correctly deduce that the reaction finished at about 4.0 minutes in part (i). Part (ii), in which candidates had to draw another line on the graph representing the use of a catalyst was well answered by the majority.

(c) Most candidates expecting to achieve a grade C and above answered this question correctly. A few candidates stated that it was because the zinc powder was already broken up and did not need to be broken up, some thought that zinc powder had a smaller surface area.

Question 7

(a) Many candidates named sulfuric acid as the electrolyte in part (i). In part (ii) carbon electrodes were a common response. Part (iii) was found to be very difficult but a number of excellent answers were seen. Too many candidates only described what happened at one electrode.

(b) This question was totally misunderstood by the majority of candidates. Few correctly stated that much energy would be needed. A number of candidates just said it would be expensive.

(c) A number of candidates correctly named the metals in the alloy solder as tin and lead but iron and steel and other metals were commonly seen.

Question 8

(a) Far too many candidates still do not know the composition of the atmosphere.

(b) Parts (i) and (ii) were generally well answered. Where candidates did not score it was because they failed to mention how the composition of the atmosphere changed.

(c) This question discriminated very well only more able candidates were able to achieve 2 out of 3 marks for this question usually for references to evolution of plants that can photosynthesise and conversion of correctly named gases into nitrogen.

Question 9

Most candidates were able to score 1 mark on this question for solvent evaporating. A number of candidates thought that the oil was the solvent and failed to score. The oxidation of the oil was less frequently seen.

SECTION C – MODULE C3

Question 10

(a) A very poorly answered question. Few candidates gave many strong ionic bonds as their response. Many candidates referred to strong intermolecular bods or just strong bonds.

(b) A number of candidates were able to score 1 mark by indicating a shared pair of electrons. There were however a large number of correct diagrams. It was pleasing to see few ionic diagrams. A surprising number of candidates failed to give the correct number of atoms.

(c) Most candidates latched onto the idea of weak intermolecular forces for 1 mark but hardly any answers made reference to a simple structure.

Question 11

(a) Generally well known.

(b) Very well answered, almost all candidates correctly named the product, sodium chloride.

(c) Again generally well answered. Some candidates called iodine, iodide in the word equation and did not score.

(d) A difficult equation to balance but well attempted by a number of candidates. A common mistake was to write the formula of Astatine as At.

Question 12

(a) and (b) Generally well answered.

(c) Part (i) was usually correct. It was pleasing to see a large number of correct answers given with many showing an awareness of the link between periods and electron shells.

Question 13

(a) and (b) Generally very well answered. Candidates lost marks if they listed other properties that were not relevant to the intended task.

(c) Most candidates correctly identified the charged particle as an electron.

Question 14

(a) Hydrogen was the expected answer but carbon dioxide and oxygen were frequently seen.

(b) OH^- was the most common answer but other particles were seen as answers.

B642/01 Unit 2: Modules C4, C5 and C6 Foundation Tier

General Comments

Only an extremely small number of candidates were entered for this examination paper. The average mark for this examination paper was 25, and the range of marks obtained was from 2 to 42. There were a significant proportion of candidates who did not attempt most of the questions.

As in January 2008 candidates found Section A much more accessible than the other two Sections, with Section C being particularly inaccessible.

Comments on Individual Questions

SECTION A - MODULE C4

Question 1
This question focussed on the ingredients and properties of a washing-up liquid and was the most accessible question in Section A.

In part (a) candidates often got two marks but seldom managed to get all three. Most candidates could link water softener with to soften water and a colouring agent to make it look attractive however the reason why a washing-up liquid contains water was less well known.

Almost all candidates could answer the two data interpretation questions in part (b).

Question 2
This question was about acids and bases.

Many candidates recognised neutralisation in part (a) but found the interpretation of formulae in part (b) much more demanding. Candidates gave a variety of numbers of elements in (b) (i) in addition to the correct answer of two. No candidate listed the elements found in sodium oxide. Although some candidates did recognise calcium hydroxide as having five atoms in its formula, a significant proportion of candidates chose ammonia instead.

Candidates found parts (c) and (d) difficult. The knowledge of acid + base → salt + water did not appear to well known and often a gas was given in (c)(i) rather than water. Copper nitrate was quite well known in (c)(ii) but few candidates gave carbon dioxide in (d).

Question 3
This question was about manufacturing speciality chemicals and the least accessible question in Section A.

Candidates in part (a) were often able to give only one cost of developing and making a drug. Popular answers included cost of workers, cost of the raw materials and the cost of energy.

In part (b) although the name continuous was known some candidates misinterpreted the question and gave the name of a process that was continuous.

Question 4
This question was about ammonium sulfate fertiliser.

In part (a) many candidates could give the name of an essential element. Nitrogen was the most popular essential element written down but potassium and phosphorus were also known by candidates.

In part (b) candidates were not awarded a mark for a vague statement such as it helps crops grow. This type of response had to be qualified such as to help crops grow bigger or to help plants grow faster. Answers that referred to replacing essential elements were also given credit in the mark scheme.

Candidates found the percentage yield calculation in part (c) very demanding. Most candidates did not quote the formula for calculating the percentage yield and those that did more often than not inverted the formula and did not multiply by 100. The correct answer of 20% was given full marks even if no working out was done by the candidate.

In part (d) the idea that pH 3.5 was an acid was well known by candidates.

SECTION B - MODULE C5

Question 5
This question involved data interpretation and calculations about the decomposition of zinc carbonate. This was the most accessible question in Section B.

In part (a) many candidates could use the graph to answer parts (i) and (ii) obtaining 60 seconds in (i) and 90 cm^3 in (ii). Part (iii) was much more demanding and a common misconception was that the reaction finished at 143 seconds where the line stopped.

In part (b) only a very small proportion of candidates could calculate the mass of a product using simple ratios.

Question 6
This question was about the Contact Process.

In part (a) only a very small proportion of the candidates could recall the word equation for making sulfur dioxide from sulfur. Common misconceptions included sulfur and air or sulfur and carbon dioxide. Other candidates used sulfur trioxide as one of the reactants.

The meaning of the reversible reaction symbol in part (b) (i) was well known but the catalyst for the Contact Process was not well known. The most frequent answer was iron rather than vanadium(V) oxide.

Question 7
This question involved the electrolysis of molten lead bromide.

In part (a) (i) both lead and bromine were given as products of the electrolysis. Although the specification only includes current and time as factors that affect the amount of product made during electrolysis, heating or temperature was allowed since if the temperature is not hot enough or if the lead bromide is cold you get no electrolysis product at all. Virtually no candidate mentioned current or time.

Part (b) was a very demanding question and only an extremely small number of candidates actually appreciated the significance of moving ions. Candidates that mentioned electrons could move in a molten liquid but not in a solid were given one mark for the appreciation that the charge carrier can only move in a liquid.

Question 8
This question was about a variety of different acids.

In part (a) many candidates appreciated that the pH of a strong acid was less than that of a weak acid.

Ethanoic acid was well known as another weak acid in part (b).

However in part (c) the gas made when ethanoic acid reacts with magnesium was not well known, many gave ethane rather than hydrogen.

The calculation in part (d) was only completed correctly by a small proportion of candidates.

Question 9
This question was about state symbols and the precipitation reactions of chloride and iodide ions. This was the least accessible question in Section B.

The meaning of the state symbols in parts (a) and (b) was quite well known but there was some confusion with (s) between solid and solution.

In part (c) the colours of the silver halides was not well known and candidates did not use the term precipitate in their answers.

SECTION C - MODULE C6

Question 10
This question used the context of the electrolysis of concentrated sodium chloride to assess the chemical test for hydrogen and chlorine. This was the least accessible question in Section C.

In part (a) the chemical test for hydrogen was often poorly expressed, for example candidates referred to the pop test or failed to mention that a burning splint must be used. The test for chlorine was not well known and the only marks awarded to candidates were as a result of the use of indicator paper. In part (iii) the formation of sodium hydroxide solution was not well known.

A variety of uses of hydrogen were given by candidates such as a rocket fuel, used to make ammonia or used to make margarine but the use in balloons was not given credit.

Question 11
This question was about chlorofluorocarbons and the ozone layer.

In part (a) most candidates could deduce or recall that fluorine was also present in chlorofluorocarbons.

Candidates often gave two uses of chlorofluorocarbons. Reference to deodorants was not given credit but propellants for deodorants was.

In part (c) although most candidates gave two medical problems if they were not sufficiently specific they were not given credit in the mark scheme. For example it was not sufficient just to state cancer it had to be skin cancer.

Question 12
This question was about aspirin.

Candidates in part (a) often struggled to give two reasons for taking aspirin and just referred to painkilling.

Candidates did not know the plant from which aspirin can be extracted.

In part (c) almost all candidates recognised that pharmacists sold medicines.

Question 13
This question was about testing for hardness in water.

The cause of temporary and permanent hardness in water was not well known. Often sodium chloride and sodium hydroxide were given by candidates.

In part (b) a significant number of candidates were not able to describe a suitable experiment. Descriptions were very vague and often did not mention mixing soap with the water, shaking, and looking for a lather. Candidates were not able to recognise a burette.

B642/02 Unit 2: Modules C4, C5 and C6 Higher Tier

General Comments

A slightly larger number of candidates sat this component than the same time last year, but it was still a small number compared to June 2008. The average mark for this examination paper was 35, and the range of marks obtained was from 5 to 60. Only a small number of candidates would have been more suited to the Foundation Tier component.

Candidates found Sections A and B more accessible than Section C.

Comments on Individual Questions

SECTION A - MODULE C4

Question 1
This question focussed on the action of detergents and data interpretation on the properties of a washing-up liquid.

In part (a) although many candidates were awarded two marks some candidates only repeated information given in the table of results and did not state a trend or pattern. The most frequent conclusions were that more plates can be washed as the temperature increases and that temperature has no effect on the amount of foam produced.

Almost all of the candidates were able to state that a detergent molecule has a hydrophilic and a hydrophobic part. A very small number of candidates drew diagrams with the hydrophobic part being the head and the hydrophilic part being the tail. Good answers explained that water molecules could bond to the hydrophilic end and fat molecules could bond to the hydrophobic end. Often this was described both by a labelled diagram and in words. Candidates who only referred to water surrounding the hydrophilic heads or fats surrounding the hydrophobic tails were only awarded a maximum of two marks.

Question 2
This question was about acids and bases and was the most accessible question in Section A.

Although many candidates did recognise calcium hydroxide as having five atoms in its formula, a significant proportion of candidates chose ammonia instead.

The knowledge of acid + base → salt + water was quite well known but sometimes a gas was given in (b)(i) rather than water. Copper nitrate was quite well known in (b)(ii) a large proportion of candidates gave carbon dioxide in (c).

In part (d) a significant proportion of candidates could write the ionic equation. A significant proportion wrote water as OH_2 but this was not penalised.

Question 3
This question was about the cost of manufacturing speciality chemicals and was the least accessible question in Section A.

Many candidates did not answer the question that was set instead they gave a list of the costs in making a speciality chemical. This knowledge comes from the low demand part of the

specification and so cannot be given credit on a Higher Tier paper. The question asked candidates to give reasons why developing and making a drug is extremely expensive. While the cost of raw materials was not awarded a mark, the raw material is scarce and so is expensive would have been given a mark. In the same way the cost of labour was not given a mark but the manufacture needs trained or specialist workers that have to be paid a lot of money was given credit.

Question 4
This question was about ammonium sulfate fertiliser and involved some chemical calculations.

In part (a) (i), many candidates could recall that ammonia is used to make ammonium sulfate. A small proportion of candidates gave ammonium hydroxide which was given credit but ammonium oxide and ammonium was not given credit. A large proportion of the candidates in part (ii) found the percentage yield calculation straight forward. The candidates often quoted the formula for calculating the percentage yield and/or showed the working out. The correct answer of 20% was given full marks even if no working out was done by the candidate.

Many candidates obtained the correct answer of 21.2% in part (b). The mark scheme allowed the answer to be rounded down to 21%. An error carried forward mark was available for those candidates who could not calculate the correct relative formula mass of 132. Only a small proportion of candidates gave an answer of 10.6%, where they only used the one nitrogen for the percentage composition stage.

In part (c) a significant proportion of candidates were able to link the presence of the nitrogen in the fertiliser to the production of amino acids and proteins in the plant. One misconception was that fertilisers contained proteins.

SECTION B - MODULE C5

Question 5
This question involved data interpretation and calculations about the decomposition of zinc carbonate. This was the most accessible question in Section B.

In part (a) many candidates could use the graph to answer parts (i) and (ii) obtaining 46 seconds in (i) and between 90 and 96 seconds in (ii). A common misconception in part (i) was that the volume was 43 cm^3 and in part (ii) was that the reaction finished at 143 seconds where the line stopped.

In part (b) (i) most candidates realised that they had to calculate the relative formula mass of carbon dioxide but did not know what to do afterwards. The correct answer was 0.00385 moles. A small proportion of candidates gave the answer as 3.85 or 0.385 which suggested they had difficulty with the use of a calculator. In part (ii) many candidates could use simple ratios to get 0.60 g but a significant proportion gave 60 g instead.

Question 6
This question involved the electrolysis of molten lead bromide including electrode reactions.

In part (a) most candidates appreciated that the charge carrier could not move in a solid but could in a liquid but a significant proportion referred to electrons instead of ions. Other candidates only described a solid or a liquid and so could only be awarded a maximum of one mark.

A significant proportion of the candidates managed to get at least one mark. The most popular way of writing the electrode reaction has the electrons being taken away on the left hand side i.e. $2Br^- - 2e^- \rightarrow Br_2$. Common errors included writing the equation back to front, adding electrons to the bromide ion and having positive electrons.

In part (c) there were some excellent answers that showed that the charge passed, using the equation Q = It, was identical in each case. Full marks could also be obtained by clearly stating that the current had increased and the time had decreased in the second experiment. Only a small proportion of candidates were not able to score at least one mark

Question 7
This question was about the Contact Process and was the least accessible question in Section B.

In part (a) although a large proportion of the candidates could recall the word equation for making sulfur dioxide from sulfur there were still several misconceptions. These included reacting sulfur with air or sulfur with carbon dioxide.

In part (b) (i) the name or formula of the catalyst the Contact Process was well known, although a significant proportion of candidates gave iron or nickel. Part (ii) was very challenging and only the most able candidates scored at least three marks. Many candidates realised that the catalyst made the reaction faster, however a significant proportion stated that it also changed the position of equilibrium. Only a very small proportion of the candidates realised that 450 ^{o}C was a compromise or optimum temperature to ensure that the reaction was fast enough without shifting the position of equilibrium to far to the left. Many candidates stated that the increase in temperature shifted the position of equilibrium to the right.

Question 8
This question was about the comparison of the rate of reaction of strong and weak acids with magnesium.

Most candidates were awarded one or two marks for this question by appreciating that hydrochloric acid was a strong acid and ethanoic acid a weak acid and as a result that there were more hydrogen ions in hydrochloric acid. A much lower proportion of candidates stated that as a result there was a much higher collision frequency between hydrogen ions and magnesium with hydrochloric acid. A large number of candidates just referred to more collisions which was not sufficient.

SECTION C - MODULE C6

Question 9
This question focussed on the electrolysis of concentrated sodium chloride. This was the most accessible question in Section C.

In part (a) a significant proportion of the candidates recalled that solution **X** was sodium hydroxide. A small number of candidates quoted sodium oxide instead.

A significant proportion of the candidates in part (b) managed to get at least one mark. Common errors included writing the equation back to front, taking electrons away from the hydrogen ions and having positive electrons.

In part (c) the gas oxygen was well known but a significant proportion of the candidates gave hydrogen instead.

The most popular response to part (d) was subsidence.

Question 10
This question was about chlorofluorocarbons and the ozone layer.

In part (a) many candidates could not express with sufficient clarity what happens to the bond pair of electrons. Candidates also referred to electrons going to ions or molecules rather than one electron going to each hydrogen atom.

A significant proportion of the candidates in part (b) referred to chain reactions or that a free radical was made when an ozone molecule was destroyed.

In part (c) a common misconception was to state that the free radicals remained for a long time rather than the actual CFC molecule.

Many candidates gave acceptable alternatives to CFCs in part (d) the most common being HCFCs.

Question 11
This question was about testing for hardness in water.

The cause of temporary and permanent hardness in water was not well known. Often sodium chloride and sodium hydroxide were given by candidates.

In part (b) a significant number of candidates were not able to describe a suitable experiment. Descriptions were very vague and often did not mention mixing soap with the water, shaking, and looking for a lather. A significant proportion of candidates were not able to recognise a burette.

A small but significant proportion of candidates did not answer part (c). Only a very small number of candidates described the formation of calcium carbonate precipitate. Many candidates described an ion exchange resin instead of washing soda.

Question 12
This question was about fats and oils and was the least accessible question in Section C.

The test for unsaturation in part (a) was not well known. Only a small proportion of candidates gave the correct colour change and an even smaller proportion could explain the test in terms of addition to the double carbon-carbon bond. Candidates that referred to bromine water going clear were not given credit.

The use of hydrogen to make margarine was well known in part (b). A common misconception was to give nickel the catalyst for the reaction.

In part (c) saponification was well known but the name of the group in fats and oils in part (d) was not well known. Candidates often gave emulsion rather than esters.

Grade Thresholds

General Certificate of Secondary Education
Chemistry B (Specification Code J644)
January 2009 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
B641/01	Raw	60	-	-	-	36	30	24	18	12	0
	UMS	69	-	-	-	60	50	40	30	20	0
B641/02	Raw	60	40	33	26	19	15	13	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0
B642/01	Raw	60	-	-	-	31	26	21	17	13	0
	UMS	69	-	-	-	60	50	40	30	20	0
B642/02	Raw	60	45	37	29	21	16	13	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0

Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A*	A	B	C	D	E	F	G	U
J644	300	270	240	210	180	150	120	90	60	0

The cumulative percentage of candidates awarded each grade was as follows:

	A*	A	B	C	D	E	F	G	U	Total No. of Cands
J644	44.2	84.6	90.4	96.2	98.1	100.0	100.0	100.0	100.0	52

82 candidates were entered for aggregation this series

For a description of how UMS marks are calculated see:
http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

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