# SCIENCE

**Paper 5124/01, 5125/01, 5126/01, Multiple Choice**

***Paper 5124/01 (Physics, Chemistry)***

| *Question Number* | *Key* | *Question Number* | *Key* |
|---|---|---|---|
| 1 | **D** | 21 | **D** |
| 2 | **A** | 22 | **D** |
| 3 | **C** | 23 | **B** |
| 4 | **A** | 24 | **B** |
| 5 | **B** | 25 | **D** |
| 6 | **D** | 26 | **B** |
| 7 | **C** | 27 | **B** |
| 8 | **A** | 28 | **A** |
| 9 | **A** | 29 | **B** |
| 10 | **B** | 30 | **D** |
| 11 | **D** | 31 | **C** |
| 12 | **B** | 32 | **D** |
| 13 | **D** | 33 | **B** |
| 14 | **C** | 34 | **D** |
| 15 | **B** | 35 | **D** |
| 16 | **C** | 36 | **C** |
| 17 | **D** | 37 | **A** |
| 18 | **B** | 38 | **B** |
| 19 | **C** | 39 | **A** |
| 20 | **C** | 40 | **B** |

***Paper 5125/01 (Physics, Biology)***

| *Question Number* | *Key* | *Question Number* | *Key* |
|---|---|---|---|
| 1 | **D** | 21 | **A** |
| 2 | **A** | 22 | **A** |
| 3 | **C** | 23 | **C** |
| 4 | **A** | 24 | **A** |
| 5 | **B** | 25 | **B** |
| 6 | **D** | 26 | **A** |
| 7 | **C** | 27 | **C** |
| 8 | **A** | 28 | **D** |
| 9 | **A** | 29 | **A** |
| 10 | **B** | 30 | **A** |
| 11 | **D** | 31 | **D** |
| 12 | **B** | 32 | **A** |
| 13 | **D** | 33 | **B** |
| 14 | **C** | 34 | **A** |
| 15 | **B** | 35 | **D** |
| 16 | **C** | 36 | **B** |
| 17 | **D** | 37 | **A** |
| 18 | **B** | 38 | **B** |
| 19 | **C** | 39 | **C** |
| 20 | **C** | 40 | **B** |

***Paper 5126/01 (Chemistry, Biology)***

| *Question Number* | *Key* | *Question Number* | *Key* |
|---|---|---|---|
| 1 | **D** | 21 | **A** |
| 2 | **D** | 22 | **A** |
| 3 | **B** | 23 | **C** |
| 4 | **B** | 24 | **A** |
| 5 | **D** | 25 | **B** |
| 6 | **B** | 26 | **A** |
| 7 | **B** | 27 | **C** |
| 8 | **A** | 28 | **D** |
| 9 | **B** | 29 | **A** |
| 10 | **D** | 30 | **A** |
| 11 | **C** | 31 | **D** |
| 12 | **D** | 32 | **A** |
| 13 | **B** | 33 | **B** |
| 14 | **D** | 34 | **A** |
| 15 | **D** | 35 | **D** |

| | | | |
|---|---|---|---|
| 16 | **C** | 36 | **B** |
| 17 | **A** | 37 | **A** |
| 18 | **B** | 38 | **B** |
| 19 | **A** | 39 | **C** |
| 20 | **B** | 40 | **B** |

**General comments**

The paper produced a mean score of 20.32 and a standard deviation of 6.61. Candidates found, papers 5124 and 5125 **Questions 7**, **14** and **15** very easy with **Questions 2** and **5** very difficult. Guessing from among some better candidates was evident from a number of the other questions.

***Physics, Paper 5124/5125/01 – Questions 1 to 20***

**Question 1** was answered correctly by 73% of the candidates. Options **A** and **C** attracted, in equal numbers, most of the remaining candidates.

**Question 2**

Very difficult with only 3% answering correctly! In choosing option **B**, the majority of candidates either ignored or failed to appreciate the significance of a curved speed-time graph. A number of more able candidates chose option **C**.

**Question 3** discriminated well with the more able candidates choosing correctly (option **C**) and the majority of the weaker candidates, ignoring the time periods at rest, the incorrect option, **A**.

**Question 4**

Excellent discrimination with candidates choosing either option **A** (correct) or option **D**.

**Question 5**

The majority of candidates failed to consider fully the information given in the responses. A possible correct combination of force and distance acting to the right of the pivot (option **A**) attracted more than twice the number of responses than did the correct response, option **B**. Ignoring the force direction, a significant number of more able candidates chose option **D**.

**Question 6**

Showed widespread guessing among candidates with option **A** attracting more responses than the correct option **D** and option **C** attracting almost as many as **D**.

**Question 7**

A surprisingly easy question although a number of more able candidates made the classical error of ignoring the force direction in choosing option **A**.

**Question 8** discriminated poorly with options **A** and **B** attracting the majority of candidates, both able and less able, in almost equal numbers.

**Question 9**

It is pleasing to note that the amplitude of a wave was known by most of the candidates.

**Question 10** showed excellent discrimination with option **C** attracting most of the weaker candidates

**Question 11**

Good discrimination although some more able candidates chose option **C**.

**Question 12** also showed excellent discrimination with the less able candidates favouring option **A** slightly more than option **D**.

**Question 13**

The definition of potential difference was not well known with a significant number of more able candidates attracted to options **A**, in particular, and **B**.

**Question 14**

The determination of resistance from a V/I graph was well known.

**Question 15**

Potential difference in a series circuit was also well known although option **A** tempted a significant number of more able candidates.

**Question 16** showed widespread guessing among all the candidates.

**Question 17**

Good discrimination. The true test for a magnet still eludes the weaker candidates whose responses were evenly spread over the three incorrect options.

**Question 18**

Excellent discrimination with weaker candidates showing a slight bias for option **C** over option **A**.

**Question 19**

Nuclide notation was well known.

**Question 20** provided good discrimination. However the novel approach to half-life posed problems for less able candidates who were equally spread over the three incorrect options.

***Chemistry, Paper 5124/01 – Questions 21 to 40 and 5126/01 – Questions 1 to 20***

**Question 21**

An easy question particularly for the better candidates.

**Question 22**

The arrangement and movement of molecules in ice was extremely well known.

**Question 23**

Another well answered question. The structure of atoms is well understood by the majority of the candidates

**Question 24**

Once again the majority of the candidates understood the properties of an ionic compound. A significant number of the candidates thought that sodium chloride did not conduct electricity when it is molten.

**Question 25**

Covalent bonding is not understood by the majority of the candidates. Over 50% of the candidates answered the question in terms of electron pairs and chose option **B** rather than total number of shared electrons as required by the question.

**Question 26**

The calculation of the mass of carbon dioxide proved easy for the better candidates. The weaker candidates simply calculated the $M_r$ of carbon dioxide and chose option **D**.

**Question 27**

This question proved difficult for the majority of the candidates. Many of the candidates, particularly the weaker candidates, chose option **D** which is the correct answer for an exothermic reaction. The better candidates recognised that the temperature of the water decreases during an endothermic reaction.

**Question 28**

This question proved difficult for even the better candidates. Less than half of the candidates recognised that the mass of zinc is doubled in the second experiment and therefore the volume of hydrogen produced also doubles because the hydrochloric acid is in excess in both experiments.

**Question 29**

An easy question for the majority of the candidates.

**Question 30**

The trends in the elements in Group I of the Periodic Table are well known by the majority of the candidates, however a significant number of candidates thought that the elements become less metallic as the Group is descended.

**Question 31**

The majority of the candidates were able to interpret the experimental results and correctly deduce the order of reactivity of the metals. A significant number of candidate chose option **B** where the metals were listed with the least reactive first.

**Question 32**

The majority of the better candidates know that magnesium is used to prevent rusting by sacrificial protection however there was evidence of guesswork amongst the weaker candidates.

**Question 33**

The better candidates found this question easy. Many of the weaker candidates answered the question in terms of properties which are important for the use of aluminium for cooking utensils

**Question 34**

This question was poorly answered by the majority of the candidates. The majority of the candidates chose option **A,** thinking that methane is responsible for the depletion of the ozone layer rather than global warming.

**Question 35**

The better candidates know that the main constituent of natural gas is methane but the majority of the candidates thought that the gas is hydrogen.

**Question 36**

Another easy question particularly for the better candidates. Many of the weaker candidates chose option **B**, the molecular formula of an alkene rather than an alkane.

**Question 37**

The majority of the candidates recognised the process as cracking although dehydrogenation and polymerisation were popular distracters amongst the weaker candidates.

**Question 38**

The majority of the candidates recognised the hydrocarbon as an alkene and were able to correctly identify the correct test for an alkene.

**Question 39**

This question proved difficult for many candidates. The most popular response was option **D**, propanoic acid and was given by significant proportion of the better candidates. Candidates should know that oxidation of ethanol does not increase the number of carbon atoms in the chain.

**Question 40**

The better candidates were able to identify the linkage as an amide link and knew that nylon contains this link. There was evidence of guesswork amongst the weaker candidates.

***Biology, Paper 5125/5126/01 – Questions 21 to 40***

**Question 21**

This relatively easy question was correctly answered by most candidates.

**Question 22**

This question caused problems. Candidates needed to recognise the role of the cell membrane in controlling water uptake.

**Question 23**

Most candidates understood that osmosis always involves water movement.

**Question 24**

Answer **C** was a popular choice here: many candidates apparently think that the optimum pH for an enzyme is always 7.

**Question 25**

Candidates had difficulty in interpreting this experiment, and they were apparently guessing.

**Question 26** and **Question 27**

Few candidates understood the role of nitrate ions (in plants) or of extra food energy for cold conditions (in animals).

**Question 28**

Candidates needed to understand the difference between absorption and assimilation; and to recognise the role of the liver, in secreting bile to aid digestion.

**Question 29** and **Question 30**

These were easy questions.

**Question 31**

Only a minority of candidates realised that the carbon dioxide concentration is highest in blood entering the lungs.

**Question 32**

This simple question proved surprisingly difficult. Carbon dioxide is not produced by anaerobic respiration in animals.

**Question 33**

Many candidates were apparently guessing here.

**Question 34**

This question was one of simple factual recall.

**Question 35**

This question was very easy.

**Question 36**

Significant numbers of candidates think that plant respiration uses up carbon dioxide.

**Question 37**

Even the better candidates had difficulty in linking sulphur dioxide pollution to acid rain and the acidification of rivers.

**Question 38**

Many candidates failed to realise that the outcome of plant sexual reproduction (from seeds) is unpredictable.

**Question 39**

Option **A** (that egg cells contain a Y chromosome) was a surprisingly popular wrong answer here.

**Question 40**

This question caused problems, even for some of the better candidates. They needed to recognise that continuous variation is along a range, and is therefore without distinct types.

# SCIENCE

**Paper 5124/02**

**Physics**

## General comments

Most candidates showed evidence of being extremely well-prepared and performed well. There was the usual range of ability, although more candidates than last year gained higher marks. It was pleasing to see that there were good answers to almost all questions; relatively few candidates showed evidence of having been inappropriately entered.

There was evidence that a significant number of candidates experienced some difficulty with questions that required use of knowledge in new situations rather than just recall.

As ever, calculations were well done by many and descriptions of experiments were clear and concise.

## Comments on specific questions

### Question 1

**(a)** This question was well done with many candidates gaining a mark for "reflection" or stating that an echo is formed.

**(b)** This question was also well done by most candidates. The mark was awarded for a clear statement that vibrations are parallel to the direction of the wave. A minority of candidates talked simply about compressions and rarefactions or were unclear in their answers. Answers such as "the particles move parallel to the vibrations" or "it moves parallel to the wave" were not given credit. Happily, only a small minority answered in such terms.

**(c)** This question was well done by most candidates. Almost all were able to apply "distance = speed x time" to find an answer for the total distance and many knew that the distance needed to be halved to find the depth of the sea. Most got the correct answer of 75 metres but a significant number did not go on to halve the answer and quoted 150 metres.

A minority of candidates tried to halve the time of 0.1 seconds, but came up with an answer of 0.5 seconds. A very small number of candidates tried to use "$v = f\lambda$". These candidates gained no credit since they used spurious science.

### Question 2

This was well done with many candidates scoring full marks.

**(a)** This was well done by most candidates who knew the appropriate formula and were able to use it to find the correct answer of 2.5 $m/s^2$.

**(b)** Again, most candidates knew the correct formula and were able to use it to calculate the correct answer of 3250 N. It was pleasing to note that a large majority were able to give the correct units to parts **(a)** and **(b)** and thus gained the unit mark. The most common mistake was in quoting the unit of acceleration as m/s.

**(c)** This was well done by most who were able to use "work done = force × distance moved" to calculate the correct answer of 1 040 000 J. A small number used 5200 – 3250 as the force and so did not get the correct answer. These were given one of the available marks for use of appropriate science. A significant minority felt that the speed needed to be used in the calculation and so used incorrect science. These gained no marks.

**Question 3**

**(a)** Almost all knew the correct formula and gained the mark. The majority went on to calculate the correct answer of 152 J. A minority lost some credit by failing to square the speed.

**(b)** Most knew that the ball had potential energy but did not specify that it was gravitational potential energy. Examiners were told to award the mark only if "gravitational" was written.

**(c)** There were many sensible energy transfers suggested and these were given the marks. Some candidates simply quoted the energy transfer as the ball was dropping rather than answering the question that was asked.

**Question 4**

This question was poorly done except by the very best candidates. Most candidates were unable to apply their knowledge to the new situation and in so doing revealed many misconceptions. The minority who were able to engage with the question gave extremely good answers which revealed a clear understanding of the scientific principles.

**(a)** Only the most able gave convincing answers. A large number failed to realise that the question was about moments of forces. Of those that did there was much imprecision in the answers. Many candidates thought that the distance from the nail to the handle was important; many thought that the centre of gravity had an effect and large numbers thought that friction was the key. A significant number seemed to think that "moments" and "forces" are inter-changeable words which mean the same thing.

**(b)** A large minority realised that the distance from nail to pivot had increased and so gained a mark. Unfortunately, most of these failed to realise that this increased the moment so a larger force was required at the handle.

**Question 5**

**(a)** This question was well done. A wide range of correct answers was seen and given credit. A very small minority stated that they had different frequencies or wavelengths, which could not be given credit when they were asked for similarities.

**(b)(i)** This question was poorly done. In previous years, the majority of candidates have shown that they know that all electromagnetic waves have the same speed and have been able to state what this speed is. Examiners reported that this year most candidates did not realise that the radio waves travel at the speed of light as is required by the syllabus. Many different wrong answers were given to this question.

**(b)(ii)** Few candidates scored both marks for this question. Examiners expressed surprise at the number of candidates who did not understand what was meant by frequency – "the time for one wave" was a common wrong answer. Even fewer knew that the prefix M means $10^6$.

**Question 6**

**(a)** This was well done by most candidates who were able to apply the formula correctly to gain an answer of 10 A. A small minority failed to convert 2.4 kW into 2400 W. Another common error was to divide the voltage by the power.

**(b)** This question was very well done. Almost all gained two marks for stating that the fuse melts and breaks the circuit should the current become too high. The minority who failed to gain both marks, usually stated what the fuse does rather than how it works. A small number stated that the fuse melts when the voltage, rather than the current, becomes too high.

**(c)** This question was poorly done by the majority of candidates. It is clear that double insulation as a means of protecting the user of an electrical appliance is not well understood. The majority of candidates simply rephrased the question, which gained no credit. Many candidates thought that the circuit had a fuse and an earth wire. Statements such as “the insulation conducts the current to earth and blows the fuse” were regrettably common.

One mark was given for stating that there are two levels or layers of insulation and a further mark was awarded for stating that insulation prevents the user from making contact with live parts of the device if a fault should develop. The second mark was awarded for such vague statements as “if one layer of insulation should fail, the second layer protects the user”. Some candidates thought that “double insulation” simply described the two layers of insulation around the cable and some discussed thermal insulation. Very few showed a clear understanding that the user is prevented from making electrical contact with live parts of the device when a fault develops.

**Question 7**

**(a)** This was reasonably well done by most candidates who gained at least one of the two marks available. One mark was awarded for stating that it was the temperature at which ice melts or water freezes. This mark was often lost because the candidate did not state that it was a temperature, simply repeating the word “point”. The second mark was given for stating that the water needs to be pure or that the pressure needs to be standard atmospheric pressure.

Common mistakes included the statement that it was the lowest temperature that could be reached, that it was the lowest temperature that the thermometer could read, and that it was the temperature at which the liquid in the thermometer froze.

**(b)** Most candidates were able to gain at least one of the two available marks. Examiners reported that some candidates confused sensitivity with responsiveness and gave an answer such as “use a thinner bulb”. A number of candidates gave the same answer twice with different wording. For example “thin bore” followed by “thinner tube”. Such answers could gain only one mark. Most candidates gained a mark for stating that the bore needed to be thinner; fewer gained a mark for stating that the bulb needed to be bigger or that a greater amount of mercury was needed.

**Question 8**

This question differentiated very well. Many able candidates scored all marks but some revealed significant misunderstanding. Some candidates found it difficult to work with the novel situation; these tended to confuse it with work from their text books and changed the question.

**(a)** Many candidates realised that there was a change of magnetic flux linking the coil and gained a mark. Some failed to gain the mark since they thought that the e.m.f. was induced in the spring. A large minority tried to adapt the question to fit their knowledge rather than use their knowledge to address the question. These candidates stated that the magnet was moved into the coil or that the coil rotated. Only a minority gained a mark for stating that the flux change was due to the rotation of the magnet. A significant number thought that there was a current in the coil which then induced a magnetic field around the magnet.

**(b)** Most candidates realised that there was a reduction in the induced e.m.f. and so gained a mark. Surprisingly, few realised that this was due to the magnet slowing down and so missed the second mark. Many simply stated that the magnet had less energy. This was thought to be insufficient for the mark.

**(c)** Almost all candidates gained a mark by giving a sensible change.

**Question 9**

**(a)** This was well answered by most candidates. The most common mistakes were “relative atomic mass” or “atomic mass”

**(b)** This was well answered by the majority of candidates, the most common mistake being to give the atomic number of caesium as 53 rather than 55.

**(c)** Only the most able candidates were able to work out the half-life from the graph. A minority of those who successfully calculated the half-life then lost credit by giving an incorrect unit.

**Question 10**

**(a)(i)** Most candidates gained credit in this question. Many calculated the correct answer of 9 g/cm$^3$. A minority did not calculate the correct answer but still gained credit for using density = mass/volume or for using 11 cm$^3$ as the volume of the ice. A minority failed to realise that the volume of ice at 0 °C was 11 cm$^3$ and used the value of 10 cm$^3$, the volume of <u>water</u> at 0 °C. Others gave an average of the density of ice and the density of water.

**(ii)** This question differentiated well. The able candidates gained a mark for stating that the density increases and a further mark for stating that this was due to the volume decreasing. Less able candidates referred only to what happens to the volume without going on to describe the effect on the density.

**(b)** This was answered well by almost all candidates. There were many pleasingly detailed accounts that contained sensible precautions for accuracy. Almost all gained marks for stating that the mass should be found and how. They went on to gain further marks for giving details of how the volume can be measured accurately and then stated clearly how the results are used to calculate the density.

**Question 11**

**(a)** Many candidates gained both marks for this question, although some ignored the instruction to copy the table on to their writing paper. Nevertheless, they were given marks. The most common mistake was to give a value of 12 Ω as the resistance of wire **Z**.

**(b)** This question differentiated well. Almost all realised that the greatest p.d. occurred across the 8 Ω resistor but fewer went on to give a convincing explanation for this. A mark was given for stating that the resistance was the same in each resistor in a series circuit and another mark was awarded for using V = IR to show that this meant that the greatest value resistor has the greatest p.d. It was not necessary to do a calculation for this part, but those who did found it easier to explain their reasoning. A minority of candidates seemed unaware that the current was equal in all the resistors and worked out incorrect values for the current by assuming that each resistor had a p.d. of 12 V across it.

**(c)** Almost all candidates gave a clear and correct diagram containing the metallic conductor and means of measuring the current and the voltage. It was, however, rare to see their circuit including a means of changing the current. It was pleasing to see that few connected voltmeters in series with, or an ammeter in parallel with, the conductor. This is usually a common fault. The majority stated clearly which readings should be taken and how to calculate the resistance from their results but fewer went on to take additional readings to check their results. Candidates should be instructed that it is good experimental practice to check results when possible and their accounts should state that this is done.

**Question 12**

**(a)** This question differentiated well. Many candidates scored full marks whilst others scored poorly. Those who realised that the extensions were proportional to the load were able to gain good marks. A minority worked with the length of the spring rather than with extensions and so gained little credit. The most common mistake, however, was to correctly calculate the new extension as 2 cm but to forget to add this to the original length of the spring to find the new length of 12 cm. This lost the candidates one mark.

**(b)** This was well done by almost all candidates who answered this question with clear statements of how the extension would change and clearly argued reasons for this.

**(c)** This question differentiated well. All candidates described an experiment to measure the extension of the spring with sensible detail. Had they been asked to describe an experiment to prove that Hooke's law is correct, most candidates would have scored full marks. They stated that the original length needs to be determined and gave good detail, including the use of pointers for accuracy, of how to measure the extension. Most then went on to state that the readings should be repeated with increasing weights and that a graph of extension against load should be drawn. Only a minority of candidates, however, were able to state clearly how they would know when the limit of proportionality had been reached. Most thought that the limit of proportionality occurred when the spring could not stretch any more. Others drew graphs without identifying where the limit of proportionality was. Only the better candidates gained marks for correctly indicating the limit on a well-drawn sketch graph or by stating that it occurred when the spring did not return to its original length.

# SCIENCE

**Paper 5124/03**

**Chemistry**

## General comments

### *Section A*

**1. (a)** Well answered, though a significant number of candidates gave 'hydrogen' as a component of clean, dry air.

**(b)** Both a pollutant and the means whereby it entered the atmosphere were needed for these three marks to be earned

**2. (a)** 'Fractional distillation' was not accepted as a correct description of this process. 'Condensing' was the change taking place in the condenser though a description such as 'changing steam/water vapour to water' was accepted for full marks

**(b)** A unit was expected when giving the temperature of boiling water.

**(c)** Most candidates realised that the impurity, salt in this instance, remained in the flask and was not somehow trapped by the condenser.

**3. (a)** While '-$CH_2$.$CH_2$-' is considered to be the correct repeating unit in this structure, '[-$CH_2$.$CH_2$-]$_n$' was also accepted for the full mark. A double bond drawn within the repeating unit caused the mark to be lost. 'Nylon' is the commonly accepted name for this structure, see syllabus, but the term 'polyamide' was also considered acceptable. Nylon is used in very many ways and this was reflected in the responses of candidates.

**(b)** Responses that described a property of these polymers and a property of iron and steel was needed to explain why, when carelessly disposed of, objects made of plastics are a longer-term problem than objects made of iron and steel. 'Plastics are non-biodegradable while iron and steel rust away' was sufficient.

**4. (a)** Balancing of the given equation was generally well accomplished.

**(b)** Relative molecular mass usually correctly calculated

**(c)** Most candidates found this fairly elementary calculation difficult. Many made no attempt to base their calculations upon the chemical equation previously balanced.

**(d)** Just using litmus paper was accepted as being a sufficient test to show that all acid had been removed.

**(e)** Few candidates realised that an advantage of using slaked lime to neutralise sulphuric acid the product, described in the question as being insoluble, is that it cannot be washed in solution into rivers and drains and so cause pollution.

**5.** Well answered.

**(a)** Most candidates could identify halogens and alkali metals from the Periodic Table provided.

**(b/c)** Both tested the ability of candidates to use the Periodic Table's trends, both physical and chemical.

**(d)** As the chemicals chosen for this question were not necessarily common, candidates were required to determine, rather than remember, the formula of two chemical compounds.

**6.** **(a)** While a fairly wide range of response was accepted for the estimated boiling point of pentan-1-ol only the response '88' was accepted for its molecular mass.

**(b)** All bonds had to be shown in drawing the structural formula of ethanol, including 'O-H'.

**(c)** Many candidates realised that, in excess oxygen, ethanol will burn to form only carbon dioxide and water.

**7.** **(a)** Candidates found it relatively easy to identify the correct order of reactivity of the four elements in a table of reactions as **C**, **D**, **B**, **A**.

**(b/c)** Few of the metals listed in this syllabus will not react with either cold water or dilute hydrochloric acid. Identification of C, probably copper, as being the least reactive of these metals and so the easiest to extract from its naturally occurring ore was not well completed.

**8.** **(a)** Many candidates could interpret these graphs as showing that the reaction was initially fast, then less fast and eventually at a halt. However, several candidates decided that point '**E**' on the graph indicated that the rate of the decomposition was increasing when in fact it wa decreasing. Candidates who identified the rate as being constant at point **G** did not earn the mark available for 'the decomposition has stopped'.

**(b)** That the rate of reaction in this particular volume of solution depends upon the number of molecules of hydrogen peroxide present, i.e. more molecules give a faster reaction, was well understood. Usually, though this need not have been specified in this case, it is the concentration of molecules/ions that determines the rate of the reaction.

***Section B***

**9.** **(a)** **(i)** Ammonia, carbon dioxide, calcium carbonate and silver chloride were the substances that had to be identified. Calcium carbonate and silver chloride were commonly identified correctly.

**(ii)** Candidates had to realise that, when testing for a chloride ion, hydrochloric acid should not be added during the investigation as it itself contains chloride ions.

**(b)** The mixture 'H' contained both a nitrate and a carbonate/hydrogen carbonate

**(c)** Several candidates chose to give chemical equations for reactions that were not part of the description and so failed to earn these two marks.

**10.** **(a)** For some unknown reason ammonia (it had been an answer to part of the previous question) was often given as an example of a gaseous mixture. While 'air' was the expected response, 'natural gas' and 'car exhaust fumes' were also acceptable. Such mixtures as hydrochloric acid were often given, incorrectly, as examples of a liquid compound. 'Water' was the expected response, though occasionally ethanol and ethanoic acid were given and accepted.

**(b)** The differences between the movement of particles within solids, liquids and gases was well described. 'The molecules have **moved** further apart' was accepted when describing a liquid.

**11.** **(a/b)** Any ore of iron was given the mark available. A good knowledge was shown of the chemistry that goes on within a blast furnace. Many correct chemical equations were included: at least two were needed for full marks to be awarded.

**(c)** Either steel or brass was usually specified as an example of an alloy. While there are many different steels, iron and carbon had to be included in listing the components of a steel.