CONTENTS

FOREWORD

This booklet contains reports written by Examiners on the work of candidates in certain papers. **Its contents are primarily for the information of the subject teachers concerned**.

SCIENCE

GCE Ordinary Level

Papers 5124/01, 5125/01 and 5126/01
Multiple Choice

Paper 5124/01 - Physics, Chemistry

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

Paper 5125/01 - Physics, Biology

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

Paper 5126/01 - Chemistry, Biology

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

General comments

Again, candidates appeared to have been well prepared for the examination although the mean scores were slightly down on last year.

Comments on Physics, Chemistry and Biology questions within the three combination papers are provided separately below.

Comments on specific questions

Physics (5124/01 and 5125/01 - Questions 1 - 20)

Question 1

Candidates seemed to find this question an 'easy starter' to help them settle into the examination.

Question 2

The statistics for this question provided evidence of guessing even among the more able candidates.

Question 3

Good discrimination among candidates highlighting once again the confusion experienced between mass and weight among the less able candidates.

Questions 4 and 5

Candidates found both these questions to their liking.

Question 6

The expression for potential energy was known by nearly all of the more able candidates but most failed to convert mass into kilograms and chose option **D**! The less able candidates showed their uncertainty by choosing the three incorrect options in roughly equal numbers.

Question 7

For many candidates the most popular incorrect choice for their answer was option **C**.

Question 8

The process of convection was well known among candidates.

Question 9

Discrimination between candidates was good with the weaker candidates preferring either options **A** or **D**.

Question 10

The ratio of Refractive Index in terms of the sines of angles was well known by the more able candidates but less so by the weaker candidates who preferred option **C**.

Question 11

Seemed to show that some of the more able candidates opted for guessing the answer.

Question 12

The nature of an echo did not appear to be known by many candidates, especially the less able, with almost twice as many responses for option **D** as the correct option **C**.

Question 13

Pleasing to note that most candidates knew which were examples of non-magnetic materials.

Question 14

There was excellent discrimination between candidates.

Question 15

Good discrimination among candidates although option **B** attracted more responses, including a significant number of more able candidates, than did option **D**, the correct one.

Question 16

Showed excellent discrimination among candidates.

Question 17

For these candidates, **Question 17** also discriminated well.

Question 18

Some candidates seemed to ignore the fact that this was a **step-up** transformer and went for response **B**.

Question 19

Over half of all candidates successfully worked out how many radioactive atoms **remained** and chose option **B**; emphasising again the importance of reading questions carefully.

Question 20

Discriminated well among all the different candidates.

Chemistry (5124/01 and 5126/01 - Question 21 - 40; 1 - 20)

Question 21

The limited accuracy of the measuring cylinder was not appreciated by over a third of the candidates. The better candidates recognised that a burette measured exact volumes.

Question 22

The majority of candidates were able to interpret the information given by the mass and proton numbers.

Question 23

An easy question for the better candidates but a third of the candidates thought that copper dissolves in a solution of hydrochloric acid.

Question 24

There was evidence of widespread guesswork in this question. Calculations involving reacting masses are not well understood by many of the candidates.

Question 25

Another question involving reacting masses which was poorly done by large numbers of the candidates.

Question 26

Many candidates did not recognise that the experiment involved an excess of calcium carbonate and chose option **D**. The better candidates realised that the reaction is quicker when the concentration of hydrochloric acid is increased.

Question 27

An easy question for the majority of the candidates.

Question 28

Another easy question particularly for the better candidates.

Question 29

The majority of candidates chose option **A** but a significant number of the weaker candidates did not appreciate that the reaction between an acid and a carbonate produces carbon dioxide in addition to a salt and water.

Question 30

The majority of candidates recognised that the gas used to fill light bulbs was an inert gas, argon, and therefore has eight electrons in the outermost shell.

Question 31

The better candidates knew that the order of the elements in the Periodic Table is determined by the proton number but a significant proportion of the weaker candidates thought that it was the relative atomic mass.

Question 32

The reactivity series is well understood by the majority of the candidates.

Question 33

There was evidence of guesswork in this question even amongst the better candidates. When iron rusts the oxygen in the air is used up and because oxygen makes up 20% of the air the water will rise up the tube to position **D**.

Question 34

There was evidence of guesswork in this question. Less than 30% of the candidates recognised that the first few test tubes would be contaminated with air from the apparatus. Option **B**, hydrogen, was the most popular distractor.

Question 35

Once again there was evidence of guesswork particularly amongst the weaker candidates. A significant proportion of the candidates thought that ammonia is an acidic gas.

Question 36

Less than 50% of the candidates knew the order of boiling point of the fractions in the fractional distillation of crude oil.

Question 37

There was evidence of guesswork particularly from the weaker candidates. A large proportion of the better candidates thought that the oxidation of ethanol produces propanoic acid, option **D**, rather than ethanoic acid, option **A**.

Question 38

The better candidates knew that change **D** involved the formation of an ester.

Question 39

The better candidates deduced the structure of the monomer although there was evidence of guesswork amongst the weaker candidates.

Question 40

This proved to be a difficult question even for the better candidates. Over 50% of the candidates thought that the linkages were the same in either fats and proteins, option **A**, or proteins and *Terylene*, option **D**.

Biology (5125/01 and 5126/01 - Questions 21 - 40)

Questions 21 and 22

These were easy questions to start off the Biology section of the paper.

Questions 23, 24 and 25

It was pleasing to see that nearly all candidates show a good understanding of the essential concept of osmosis, enzyme action and photosynthesis.

Question 26

This question, on plant mineral nutrition, discriminated well between candidates of different abilities.

Question 27

Candidates found this question difficult, evidently because they did not realise that protein can be used as a source of energy.

Question 28

This question discriminated well, with weaker candidates often choosing **C** (the pancreas) despite the fact that an acidic digestive juice was specified.

Question 29

This question also discriminated well, with weaker candidates evidently guessing.

Question 30

This question proved difficult. Candidates apparently do not understand that blood will only flow down a pressure gradient.

Questions 31 and 32

It was pleasing that most candidates could cope well with the unfamiliar contexts of these questions.

Question 33

This straightforward question proved to be easy.

Question 34

This was difficult, with many candidates being misled by the word ‘flowers’ in the question, and so choosing **A**. Candidates had to read the question carefully, and then understand that a failure of pollination will prevent formation of *fruits*.

Question 35

Candidates showed a good understanding of plant gas exchange.

Question 36

This question discriminated well, only the better candidates linking sulphur dioxide to acid rain and the acidification of rivers.

Question 37

This was an easy question.

Questions 38 and 39

Surprisingly, these straightforward questions were answered incorrectly by about one-third, and about one-quarter, of candidates, respectively.

Question 40

This genetics question discriminated well between candidates of different abilities.

Papers 5124/02 and 5125/02
Paper 2 - Physics

General comments

As in previous years candidates performed better on the structured questions found in ***Section A*** than in the more open questions of ***Section B***. Some candidates did not given enough thought to the questions being asked but relied on reproducing text book statements about the topics. There was evidence that some candidates had not done a thorough preparation for the examination, shown by incomplete answers and the quite frequent mark less than 10 out of the maximum of 65. Mathematical skills were tested by even the simple requirements of substitution into a formula such as F = ma.

Comments on specific questions

Section A

Question 1

(a)(b) These were answered well, with correct units in most cases.

(c) Few candidates managed to calculate the correct answer. A majority simply calculated the product of maximum speed and time, instead of using average speed. Hardly anyone drew a sketch to find the area under the velocity-time graph.

(d) Answered well.

Answers: **(a)** 2.5 m/s^2; **(b)** 2000 N; **(c)** 80 m; **(d)** 160000 J.

Question 2

The answers were disappointing, with evidence suggesting that quite a high proportion of the candidates had not studied moments.

In the answers to **(b)** it was often impossible to see the position of the centre of mass chosen by the candidates, and few specified this position by marking its distance from a given point.

Answers: **(a)** 180 Nm; **(b)(ii)** 200 N.

Question 3

The answers to this question were usually good, the only problem being the usual confusion between 'sensitivity' and 'responsiveness'.

Question 4

The answers were almost always incomplete, and mostly incorrect.

The starting point should have been to draw a straight line from the tip of **O** to the tip of **I**. This would then represent the ray passing through the centre of the lens.

There was confusion between the focal length (a distance) and the focal point (a position).

Question 5

Most parts of this question were answered reasonably well.

In **(b)** a majority of candidates quoted the correct value for the speed of light. Some quoted a value for the speed of sound. A surprisingly common error was to give the speed as 3×10^{-8} m/s. Quoting such a low value shows a lack of thought about the answer being given.

Answers: **(b)** 3×10^{8} m/s.

Question 6

(a) The answers to this question were generally good, most candidates being aware of the formula V = IR. Some had difficulty in rearranging the formula in order to calculate R.

(b) There was not much evidence of candidates using the graph to find the answers. Instead most candidates relied on an attempt to calculate and then use the combined resistance.

The simplest approach to **(b)(i)** was to add the currents from **X** and **Y** as read from the graph for an e.m.f. value of 4.0 V. For part **(ii)** the voltage at which the two currents added to give 0.3 A could be found from the graph. However full credit was given for any valid method.

Answers: **(a)** 20 Ω; **(b)(i)** 0.6 A, **(ii)** 2.0 V.

Question 7

(a) This was started well by most candidates, the turns ratio formula being generally known. But the handling of the arithmetic was too difficult for many.

(b) The 'power in = power out' formula was widely known, but many mistakes were made by incorrect substitution, candidates frequently confusing the primary and secondary circuits.

Answers: **(a)** 4.8 V; **(b)(i)** 2.0 A, **(ii)** 0.04 A.

Question 8

The answers to this basic question on the structure of atoms were surprisingly poor. There were frequent references to alpha and beta particles, and many answers gave no mention of 'nucleus'.

Answers: **(a)** and **(b)** 6 protons and 7 neutrons (in the nucleus), 6 electrons orbiting the nucleus.

Section B

Question 9

(a) This question was done well by most candidates. The simplest method for finding the volume, using a measuring cylinder containing an initial measured volume of water, was clearly described. However there were some candidates who were unaware of the definition of density, confusing it with the mass of an object.

(b) There was some confusion in the answers to this part. The crucial point is that the mass of an object is the same in all locations, whereas the weight is determined by the strength of the gravitational field (g). For part **(iii)** the force required is calculated by finding the product of mass (not weight) and acceleration. So the force would be the same at both places.

Question 10

(a) Answers to this question were frequently confused, as many candidates seemed to be providing a list of all types of energy without linking them to the stages involved in the generation process. In outline, potential energy of the water (at a high position) is converted into kinetic energy as the water falls. This then produces kinetic energy of the turbines that produce electrical energy by rotating the generator.

(b) This part was not answered well. The concept of efficiency was needed to explain why the output of the generator would be less than that required to return the water to its initial position. In all mechanical processes energy is lost, usually in the form of heat.

Question 11

(a) This standard experiment was usually described well, but many candidates drew several plotting compasses arranged around the magnet instead of describing how a single compass is used by marking its position and then moving it to a neighbouring spot.

(b) The descriptions of induced magnetism were usually incomplete. Little mention was made of the important point that each nail itself becomes a magnet with North and South poles, opposite poles then attracting.

It is encouraging to see that very few candidates now refer to ‘charges’ when discussing magnetic effects.

Papers 5124/03 and 5126/03

Paper 3 - Chemistry

<u>Comments on specific questions</u>

Section A

Question 1

Uses of substances

Well answered. The uses described in the syllabus were those usually given by candidates, including ‘cement manufacture’ as a use for calcium carbonate. Other uses, if chemically correct were, of course, also accepted including the commonly described ‘sacrificial protection’ as a use for zinc. Some confusion over the use for silver salts and the use of silver metal. Both ‘in photography’ and ‘in testing for a chloride’ were considered sufficient to earn the mark available for a use of silver salts.

Question 2

Names of reactions

Not an easy question. Fractional distillation, cracking and hydration (and even 'hydrolysis') were descriptions that were accepted. The third, 'hydration or hydrolysis', was not well remembered.

Question 3

Groups in the Periodic Table

(a) Both '1', '1' and 'one' were accepted as describing the number of the Group of the Periodic Table that contains alkali metals.

(b) Both the use of a noble gas and its name was required for full marks. Some confusion over the use of helium for filling balloons, e.g. 'filling hot-air balloons' was marked as incorrect. Use of argon 'as an inert gas' or one that 'prevents oxidation' in particular processes were both accepted. Using radon to 'estimate the thickness of materials' was occasionally given and marked as correct. The reason for the stability of noble gases was only accepted if 'full electron shells' or 'inability to give or receive electrons' were mentioned. That the gases are 'stable' or that the 'valency shell is full' were not considered enough to earn the mark available.

Question 4

Estimating fraction of oxygen in air

This relatively traditional approach to measuring the fraction of air that is oxygen provided a good basis for asking questions that tested something more than just simple recall of facts. The gas that reacts with phosphorus was rarely described incorrectly but a common error was to describe the water as rising, after a few days, to just below what remains of the piece of phosphorus. Only nitrogen, carbon dioxide and argon were accepted as being the gases that remain in the tube after a few days.

Question 5

Metals from the planets

(a) The novel circumstances of this question again enabled the assumption to be made that higher abilities were needed for it to be answered correctly. Most candidates were able to put the elements 'beium', 'ceium' and 'deium' in this order of reactivity, most reactive first.

(b) Naming any metal that does not react with water was considered sufficient to earn the mark available. Many candidates could explain why planets could be a source of metals at some time in the distant future.

Question 6

Reaction Rates

(a)(b) The use of dataloggers did not prevent candidates answering this question to a high standard. Many candidates failed to realise that the loss of mass of a flask and its contents was the result of gas (carbon dioxide) loss.

(c) Writing 'reactants are used up' failed to earn any marks. Deducing information from the graph was done well.

(d) The graph drawn has to show that the reaction rate was greater - one mark- and stopped after losing an identical mass of carbon dioxide as graph **G**.

(e) Most candidates realised that heat is given out in reactions that are described as 'exothermic'.

Answer: **(c)(i)** 120 – 140s.

Question 7

Elements, compounds and mixtures

Not an easy question. Candidates answering with the names of particular elements, compounds and mixtures were penalised once and so could, with correct responses, earn two marks. Even so, candidates did find this question difficult. It stretched academically even the best candidates and so this was a good question for detecting these high ability candidates.

Question 8

Simple chemical analysis

Barium sulphate, ammonia, copper(II) hydroxide and copper(II) sulphate were, respectively, the required responses. Copper hydroxide and copper sulphate were accepted for the full marks. Copper nitrate and copper carbonate gained a single mark, for 'copper'.

Question 9

Metal/alloy/non-metal structures

Drawing one of the atoms in the alloy somewhat larger than in real-life achieved the purpose of making the reasons why alloys are more difficult to stretch than pure metals easier to detect and relate. A description was required that showed an understanding that it is easier for layers of identical metal atoms to slide one over another than it is for layers with atoms of different sizes (the alloy) to do so. By no means an easy concept but very often described correctly.

Most candidates could explain how heat is conducted by metals and give other differences between metals and non-metals.

Section B

Question 10

Ethanol preparation and a calculation

The laboratory production of ethanol solution from sugar solution was poorly described. Few candidates seemed to realise that yeast is essential for this change to take place.

The correct formula for ethanol was usually given correctly as was the displayed formula. As in previous years for full marks to be awarded the displayed formula had to display separately, with their bonds, all the atoms present.

Answer: **(b)** 52%.

Question 11

Properties of acids and alkalis

(a) There was some confusion between 'alkalis' and 'alkali metals'. Many candidates described the properties of sodium, for example, rather than the properties of sodium hydroxide solution. Alkalis were described, wrongly, as having a sour taste. 'Slippery to touch' was accepted as a property of alkalis.

Either hydroxide or hydroxyl ions were accepted as the cause of alkalinity: either hydrogen ions or hydroxonium ions were accepted as the cause of acidity.

(b) Few attempts were made to write the equation for the reaction of sulphuric acid and sodium hydroxide solution. Fewer attempts were made to write the ionic equation.

Question 12

Atoms, ions and isotopes

(a) Proton number and mass number were well defined.

(b) Atomic and electronic structures of atoms were often given correctly and the element, sulphur, was correctly identified from the data given. Few candidates could explain why sulphur is classed as a non-metal i.e. its atoms accept electrons in obtaining a stable, noble-gas-like electronic structure.

Papers 5125/04 and 5126/04

Paper 4 - Biology

General comments

The overall performance of a number of candidates was rather poor, with many showing both a patchy and a shallow knowledge of the syllabus. Only a few candidates showed a good grasp of the subject and an ability to use their knowledge within the frame of each of the questions. Many candidates simply wrote out what they knew about a topic rather than answering the question. This was particularly common in ***Section B***. Performance in ***Section B*** was noticeably poorer than in ***Section A***, probably reflecting the lack of detailed guidance and the more open-ended approach in the ***Section B*** questions. It was clear that some candidates did not understand the precise nature of the question being asked, and that poor ability to work in a second language may have contributed to this lack of understanding.

Comments on specific questions

Section A

Question 1

More able candidates gained all four marks, weaker candidates one or two. A common error was sperm duct for 'transports sperms through the penis to the vagina', though most possible incorrect answers were seen.

Question 2

(a) Most candidates scored two or three marks. Common errors were cell wall for **B** chloroplast for **C** and cytoplasm for **D**.

(b)(i) More able candidates gained this mark, but weaker candidates made incorrect suggestions that included stomata, cell wall and chlorophyll.

(ii) Many candidates correctly suggested cell membrane. Common errors were cell wall and nucleus.

(c) The majority of candidates made one correct suggestion from cell wall, chloroplast and vacuole. More able candidates scored both marks. Weaker candidates often suggested cytoplasm, cell membrane or leaves.

Question 3

(a) Very few candidates could define these terms. Some of the more able candidates used the term allele, but did not relate this to the expression of characteristics or mention phenotypes. Most candidates based answers on strength of genes, or whether the disease was present or not.

(b)(i) Most candidates scored this mark.

(ii) More able candidates scored this mark. The most common incorrect answer was pp.

(c) Most candidates were able to draw a sensible diagram, but the majority included the incorrect genotype PP for one parent. A number of the more able candidates correctly predicted the genotypes of offspring, but did not clearly show how these gave 50% suffering from PKU.

(d) Very few candidates realised that the correct answer is zero. The most common incorrect answer was 50%.

Question 4

(a) Most candidates could name process **A** as evaporation and process **B** as condensation, but very few could name either of the other two processes. Common incorrect answers were transpiration and translocation. Many weaker candidates scored no marks.

(b) The majority of candidates incorrectly gave a description of the effects of deforestation on the land, e.g. erosion. Only the most able candidates described an effect on the water cycle. Of these very few could give an explanation, based on reduced transpiration. A number of weaker candidates wrote irrelevant answers about increase in atmospheric carbon dioxide, with no reference to the water cycle.

Question 5

(a)(i) Only the more able candidates managed to carry out this calculation correctly. Most other candidates subtracted 6.27 from 6.42 to get the difference of 0.15 correctly, but failed to divide this by 6.27 in the calculation of percentage 100 x 0.15/6.27 = 2.4%. Many weaker candidates made no attempt at the question.

(ii) More able candidates chose sensible axes and labelled them, though few included the unit for concentration of sugar in the axis label. Weaker candidates often chose very short axes or mislabelled the numbers on the axes. More able candidates plotted accurately, but few used a ruler to draw a straight line. A large number of candidates failed to complete a graph.

(b)(i) Most candidates knew this process to be osmosis, though a sizeable minority incorrectly suggested diffusion.

(ii) Few candidates could give a clear explanation of why some potato pieces gained mass. Many lost marks because they did not make clear whether they were writing about concentration of sugar or concentration of water. Many candidates incorrectly thought that the potato pieces absorbed sugar solution.

(c) Those who managed to draw the graph generally read off the correct value to gain this mark.

Question 6

(a)(i) Most candidates correctly suggested obesity or heart disease.

(i) All but the weaker candidates correctly suggested constipation. Some described the problem and were given credit.

(b)(i) More able candidates scored all three marks, weaker candidates generally scored two marks. Common errors were sugar and fat.

(c)(i) Most candidates gained a mark for the suggestion that salivary glands lubricate food to make swallowing easier. Few named amylase as an enzyme that helps to break down starch and that is produced by salivary glands. Many weaker candidates gave incorrect answers based on the breaking up of food into small pieces.

(ii) More able candidates knew that digested food is absorbed in the ileum. Weaker candidates thought that digestion takes place here.

(iii) Most candidates knew that water is absorbed in the colon, some also suggested minerals are absorbed. Many weaker candidates incorrectly suggested that the colon stores waste material.

Section B

Question 7

(a) The majority of candidates could name four components of blood, though many of the weaker ones made incorrect suggestions such as artery, vein, capillary. More able candidates gave concise and accurate descriptions of the functions of the four blood components. Some candidates gave long descriptions of blood circulation and function of the heart which were not relevant to the question. A number of candidates incorrectly stated that red blood cells transport blood around the body. Other common incorrect suggestions were white blood cells 'to clot blood' and plasma 'to clot blood'.

(b) The majority of candidates referred to fatty deposits blocking arteries, but did not score this mark because they were not specific about this happening to the coronary arteries or arteries supplying blood to heart muscle. Some candidates incorrectly thought that arteries supplying blood to the main circulation around the body became blocked, and that this strained the heart. Only the more able candidates gave specific answers that gained the first mark. Most candidates correctly suggested a possible cause of coronary heart disease, with 'eating too much fatty food', 'smoking' and 'lack of exercise' seen with about equal frequency.

Question 8

(a) Very few candidates could give a correct definition of a hormone. A few of the more able mentioned glands or target organs, but few gained more than one or two of the four marks available. Many weaker candidates thought that hormone action is confined to changes at puberty or during sexual activity. Likewise, very few candidates could suggest a difference in the action of hormones and nerves. Common incorrect suggestions referred to voluntary and involuntary actions. Comparisons of speed and length of action were rarely seen. Some weaker candidates described the action of a reflex arc.

(b) Most candidates described one situation where adrenaline would be released, but few gave more examples. Many gave long descriptions of the effect of adrenaline on parts of the body, gaining just the one mark allocated for this information. Few candidates gave clear answers as to how release of the hormone would help the person e.g. increase muscle activity to enable him/her to run faster.

Question 9

(a) Only the more able candidates realised that this question is about obtaining accurate and reliable results. Many candidates wrote long answers that did not mention any action to improve either of these. Even the majority of the more able candidates gave only a few suggestions, gaining some but not all of the six marks available. Just a few candidates gave a comprehensive list of actions, e.g. using the same type of seedlings and fertiliser, ensuring that the seedlings received the same amount of sunlight and water, keeping the seedlings at the same temperature, repeating the experiment and averaging the results etc.

(b) Most candidates knew and stated that the more nitrogen containing fertiliser used, the higher the seedlings grew. For many this was the only mark scored. Few continued to describe that this effect decreased as the amount of nitrogen compounds used was further increased, or that the effect had an optimum dosage of fertiliser, with no further effect when this amount of fertiliser was exceeded. Many candidates incorrectly suggested that the seedlings stopped growing when more than a certain amount of fertiliser was added. Only a few candidates made the correct suggestion that the seedlings did not grow any faster when more than a certain amount of fertiliser was added. Very few candidates related the results to the use of nitrogen by plants to make proteins.