



GCSE

Additional Science B J641

Gateway Science Suite

General Certificate of Secondary Education

Report on the Units

January 2008

J641/MS/R/08J

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This report on the Examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the syllabus content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the Examination.

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Gateway Additional Science B J641

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B623/01 Foundation Tier

General Comments

The performance of the candidates was good overall. Marks below 20 were not frequently seen whilst the number of very poor marks (<15) was extremely low. There were many excellent scripts with marks in the high forties and even above fifty. Some of these candidates may well be entered for the Higher tier in the summer.

Candidates scored more highly on the Chemistry section and found Biology the most demanding. The areas of the syllabus where candidates displayed sound levels of knowledge and understanding were:

- blood circulatory system
- Periodic Table
- factors that affect thinking distance
- car safety features

Some areas of the syllabus were not clearly understood such as:

- the structure and function of sperm cells, in particular the acrosome
- investigation of phototropism and hormones in plants
- flame tests
- speed cameras and the meaning of thinking distance
- air resistance.

There was evidence in the nature of responses to indicate that Centres had gained valuable experience in the first round of examinations in 2007 and had coached their candidates accordingly.

There was no evidence of time being an issue scripts with lots of unattempted questions were rare and scripts with gaps towards the end were not seen.

There was no evidence of any misinterpretation of the rubric.

Comments on Individual Questions

- 1 (a) Many candidates failed to answer this question. Perhaps they did not realise that it was a question?
 (b) The majority gained this mark. Errors were evenly divided between 'cytoplasm' and 'nucleus'.
 (c) DNA was not widely known, protein was a sometimes given. Less than 20% gained this mark.
 (d) This was clearly the most well answered part of the first question, 'make more cells' the most common response. The main error was to write in terms of repairing cells.
 (e) (i) Very few knew acrosome well enough to answer this question. Sperm was the frequent mistake.
 (ii) Although some had an idea of what it does answers were not accurate enough to gain this mark. Fertilising the egg was the popular misconception.
- 2 (a) Both marks were gained by a considerable number of candidates. 'Similar' for the first response and 'zygotes' for the second were the frequent wrong answers
 (b) (i) The graphical skills of many candidates were weak, plotting the last two points caused the most difficulties.
 (ii) Lines were frequently poorly drawn; often 'sketch' or 'dot-to-dot' lines were drawn.
 (c) A broad range of acceptable responses were given by all but a few candidates.

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3 (a) Correct choice by the majority, the fourth box the occasional wrong selection.
 (b) This was a well answered question although candidates often included oxygen.
 (c) (i) Again, well answered, blood cells being the infrequent mistake.
 (ii) This mark was gained by most candidates, oxygen being the common error.
 Possibly oxygen was too strong a distracter.

4 (a) Candidates found this question difficult but scored reasonably well due to a favourable Mark Scheme. Diagrams sometimes contradicted the written part of the answer. There were very few answers that included; use the same type of plant/leave the plants for the same length of time/plants in dark grow straight. Consequently very few answers scored all three marks. Poor answers used the box to **stand** one plant on and the scissors to cut **the plant**.
 (b) Poor response in the main 'ripening' the popular correct response whilst 'growth' and 'reproduction' answers failed to hit the mark.

5 (a) Well answered overall, any error being with the second response.
 (b) On the other hand this part of the question was poorly done. Energy or heat added to one side of the equation, or oxygen on the left hand side spoilt potentially good responses. Very few attempts at a symbol equation, all of them wrong.
 (c) There were a lot of sound answers in this part of the question; 'changes colour' the most frequent response that was heading in the right direction but failing to gain the mark.

6 (a) & (b) Most candidates gained both marks, 'ionic' the error in part (a).
 (c) Only the more able candidates gained the mark here. High freezing point or merely restating that it is a gas reflected poor understanding.

7 (a) Well answered, most candidates gained two marks often for observations. Marks for the method were less frequent, poor answers were centered around heating the chemicals in the bottles or incorrect use of a splint. ie the wrong experiment.
 (b) Satisfactory answers with no obvious pattern to incorrect choices.

8 (a) Only the very best candidates gained credit in this question. Whilst some gave 'liquid' for bromine the correct colour for chlorine was rarely seen. Very few gained both marks.
 (b) Astatine was given as the answer far too often as the most reactive halogen.
 (c) Uses were well known but a good number reversed the chlorine and iodine responses.

9 (a),(b) & (c) The responses reflected good skills in being able to correctly use the Periodic Table.
 Some gave '23' as the answer to (b).
 In part (c) the candidates who failed to score put; krypton and boron.

10 (a) (i) Many, if not most, candidates answered in terms of warning the drivers of the presence of the camera or that they should slow down.
 (ii) Too many candidates thought that two pictures were to record the front and rear number plates.
 (b) (i) Whilst the mark for the idea of reacting or having to apply the brakes was often gained the majority of answers started off with reference to **time**.
 (ii) This part of question 10 was well answered. A few answers referred to weather or road conditions, a small number put drugs **and** alcohol and only gained one mark. The Mark Scheme was targeted at lower foundation grades and was relatively generous as the candidates struggled with the question. The Mark Scheme may well be more rigid in the future.

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11 (a) and (b) The marks were gained more often than not through common sense type answers.
(c) Passive safety features caused great confusion with candidates. Many repeated 'air bags' from the earlier part of the question or spoke of electric windows or child locks.

12 (a) (i) – (iv) Large numbers of candidates scored good marks in all parts of this question although attempts at part (ii) were clearly the most successful.
(b) The calculation was successfully tackled by the majority of candidates but too many scored only one for $4000 \div 100$ because they then did the arithmetic incorrectly.
(c) A big majority gained this mark.

13 (a) (i) Most candidates constructed answers around the low weight. 'Because it's light' was commonly given as an answer but gained no credit.
(ii) The use of a different racquet or hitting the shuttlecock differently were far too common as candidates failed to grasp that they were meant to do something to **change** the shuttlecock. Similarly, potentially good references to streamlining failed to suggest how this would be achieved.
(b) Poorly answered. Candidates constructed answers around 'no air' or 'lack of / no gravity' and failed to mention that there was no air **resistance**.

B623/02 Higher Tier

General Comments

The level of difficulty of the paper was judged to be appropriate by all assistant examiners. The paper produced a wide range of marks with a standard deviation of 9.8. The mean mark for the paper was 34.5 demonstrating significant accessibility for candidates. 40 marks were required to gain grade A and 21 for grade C. As expected the candidature for this paper was mostly made up of year 11 students with very few re-sitting the paper.

The physics section of the paper produced the highest marks with, for the majority of candidates, the biology section scoring least well. The majority of centres entered candidates appropriately, but there was a small number of candidates who would have been better served by entry to the foundation tier.

Comments on Individual Questions

- 1 (a) (i) The vast majority of candidates could plot the points correctly and gained 2 marks.
 (ii) Again most candidates drew an appropriate curve through the points. A minority drew either 'dot to dot' or multiple lines and lost the mark.
- (b) Most candidates scored this mark as they were able to communicate the idea that there was a problem with Gary's growth or development.
- 2 (a) Candidates found this question more testing than question 1. Common correct answers included 'large surface area' and 'thin wall'. Weaker candidates referred to 'thin cell walls' or made vague references to feeding the foetus or providing comfortable surroundings for the foetus and failed to score.
 (b) (i) This was answered well by more able candidates.
 (ii) Most candidates knew that the tricuspid valve prevents backflow. The most common error was to state that the valve was 'pushing the blood'.
 (c) The mark was most frequently awarded for 'pumping blood around the whole body' or 'has to pump at high pressure'. A frequent misconception was that the left ventricle has to withstand pressure.
- 3 (a) (i) Only the most able candidates scored this mark for correctly quoting enzymes. The question was frequently omitted. Answers such as DNA, acrosome or mitochondria were common.
 (ii) Again only better candidates realised that the enzymes digested the egg membrane. Common incorrect answers included reference to cell wall rather than cell membrane or fertilising the egg.
- (b) This question was well answered only by better candidates who quoted 'respiration'. Some candidates referred to 'mitosis' and failed to score.
 (c) The mark scheme required a comparison between mitosis and meiosis to score. For example, 'mitosis produces identical cells whereas meiosis produces different cells' would score 1 mark. The question differentiated well with better candidates scoring both marks and weaker candidates making vague references to mitosis producing body cells and thought that meiosis was for gamete production.

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4 (a) The majority of candidates scored this mark. A small number of candidates angled the shoots diagonally with no straight section, a few had the shoot growing straight up and a few bent the shoots to the right. All of these responses failed to score.

(b) This question discriminated well at the higher grades. Only the best candidates scored both marks. Most marks were awarded for recognising that auxin was in the tip. Candidates often gave vague answers, lacking in accuracy, which were not credited. For example many simply said that 'the tip was covered in black paper' without going on to say that 'the light could not reach the tip / auxin'.

5 (a) DNA fingerprinting was not well understood by the majority of candidates. They did not understand that the DNA must be cut into fragments or that it is separated using an electric current. Many candidates referred to looking at DNA under a microscope.

(b) (i) The better candidates correctly stated three, but a large range of incorrect answers were seen with 9 being the most common.

(ii) Better candidates correctly stated the base code. Others seemed to have little idea of what was required.

6 (a) This was generally well answered. Weaker candidates lost the mark by including either 'heat' or 'oxygen' as a reactant. A small minority attempted a symbol equation and gave incorrect formulae, failing to score.

(b) A majority of candidates correctly stated 'blue', but all colours were seen. 'Orange' was the most popular incorrect answer.

(c) This question was poorly answered by all except the best candidates. 'Precipitate' was the required answer and 'insoluble solid' the most popular unacceptable response.

7 (a) Most candidates correctly chose 'covalent'. 'Ionic' was the most frequent incorrect answer.

(b) This was again well answered with 'low boiling point' and 'does not conduct electricity' being the most common acceptable responses. Weaker candidates often stated 'gas' or 'high freezing point'.

(c) The number of candidates (including those who did not score on easier questions) who scored 2 marks was pleasing. Those who failed to score usually offered ionic bonding involving electron transfer.

8 (a) Flame tests were well known with most candidates scoring both marks. Marks could be scored from a labelled diagram. The most common errors were candidates heating the solids in a test tube or testing them with a lighted splint!

(b) (i) Most candidates could correctly identify hydrogen, although 'carbon dioxide' was a common incorrect response.

(ii) This question was poorly answered by all except the best candidates. 'Sodium' or 'sodium oxide' were the most common of a wide range of incorrect answers.

(c) This question was answered very well by the most able candidates, who were able to offer answers referring to electron shielding and distance of the outer electron from the nucleus. The minimum response required was that potassium loses electrons more easily than sodium.

9 (a) This question discriminated well at grade C. Better candidates scored both marks. A common incorrect colour for chlorine was 'orange'.

(b) There was a large range of answers. Candidates are advised to examine the differences between successive values when attempting questions of this type.

(c) This question was well answered by better candidates who could both enter the correct formulae and then balance the equation. Common incorrect answers included ' $\text{Na} + \text{Cl} \rightarrow \text{NaCl}$ ' or ' $\text{Na} + \text{Cl}_2 \rightarrow \text{NaCl}_2$ '.

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10 This was well answered by most candidates. Some candidates stated 15 neutrons and 16 electrons, whilst another common error was 31 neutrons.

11 (a) This two stage calculation discriminated well across the ability range. Better candidates could correctly calculate the total distance covered (14m) which gained 2 marks and then go on to divide by 7 to get the distance between each line. Middle ability candidates gained 2 marks for correctly calculating the total distance, but stopping at that point. Weaker candidates used the wrong equation or worked out $28 \div 0.5 = 56$ and failed to score. A number benefited by the error carried forward approach adopted to incorrectly calculated distances.

(b) (i) Most candidates scored 2 marks on this question. Common correct answers included alcohol / drugs, tiredness and lack of concentration. Responses which failed to score included references to weather conditions or distractions outside the car.

(ii) This question was also well answered. Most candidates quoted poor weather conditions eg 'icy'. A significant number of candidates lost the mark for stating such things as 'road conditions' or 'brakes' or 'tyres' without qualification.

(c) This question had a level of response mark scheme. Most candidates scored the 1 mark response for recognising that as the speed increased, the braking distance increased. Many scored 2 marks for recognising that if the speed doubles, the braking distance quadruples. A minority gained 3 marks for a clear statement of the square relationship.

12 The most frequently scored mark on this question was 2 marks. Most candidates realised that the driver's energy is 'absorbed' by the airbag. And that the acceleration of the driver is 'reduced' by the collision. Many thought that the stopping time and stopping distance were either unchanged or reduced.

13 (a) (i) The majority of candidates correctly chose E with B and D being the most common incorrect responses.
 (ii) Most candidates correctly stated E or D.

(b) This calculation was done well by the majority of candidates. Weaker candidates incorrectly gave 400 but scored 1 mark if they showed their working ie $4000 \div 100$.

14 (a) Most candidates scored this mark, stating 'more drag' or 'more surface area' or 'more air resistance'. Occasionally candidates contradicted themselves and lost the mark.

(b) The idea of balanced forces was well understood by most candidates.

(c) This question was again well answered. Those candidates who failed to score usually made reference to the shuttlecock being lighter or having less mass.

B624/01 Foundation Tier

General Comments

The paper performed well and overall produced a high level of discrimination. The questions were accessible to all pupils. As expected there was a small entry (219) for this paper at this stage in the course. Those centres entering pupils should be congratulated on choosing the correct tier for their pupils. The marks ranged from 3 to 50.

Comments on individual questions

- 1 Candidates of all abilities were able to score on this question. Most candidates were able to identify the nucleus (part **X**), the chloroplast (part **Y**) was rarely seen as an answer and candidates often confused cell wall and cell membrane for part **Z**.
- 2 In part (a) most candidates identified insecticide as the correct answer. Part (b) discriminated well with only the better candidates being able to describe biological control as using other living things to control pests examiners accepted a sensible example such as using ladybirds (to control the greenfly). Part (c) proved to be the most difficult question on the paper. Only a handful of candidates knew the word hydroponics. Most candidates correctly answered part (d) knowing that minerals are taken in to the plant through the roots.
- 3 In part (a) the majority of candidates scored 2 marks for stating that water entered the plant through the roots and left the plant through the leaves. Only the better candidates were able to write about the processes involved. Candidates gained one mark for a correct process. Examiners were looking for transpiration or evaporation but accepted higher level answers such as osmosis, capillary action or root pressure.
In part (b) the majority of candidates knew that photosynthesis took part in the leaf higher level answers of palisade cells or chloroplasts were accepted.
- 4 Most candidates identified potato peelings as the other type of household waste that can decay. A small number of candidates clearly did not read the question and gave grass cuttings as their answer.
In part (b) (i) examiners were looking for the idea that it allowed oxygen (air) and decomposers to enter the compost bin and heat energy escape. In part (ii) examiners were looking for the idea that the temperature was higher in summer so the bacteria were more active.
Part (c) proved difficult, examiners were looking for the answer respiration but this was rarely seen. They accepted the names of the organisms producing the carbon dioxide such as bacteria, fungi, saprophytes, decomposers.
- 5 Most candidates were able to complete the table correctly and correctly draw the pyramid. There were many poorly drawn (freehand) pyramids suggesting that the additional materials (pencil and cm/mm ruler) listed on the cover were not available to all pupils. Part (b) produces some strange fuels from plant biomass. Examiners were expecting any one from a large range including wood / alcohol/ ethanol/ biogas/ methane/ peat/ charcoal/ etc.

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6 Part (a) discriminated well with only the better candidates knowing Buckminster fullerene. In part (b) many candidates described the properties eg hard, does not conduct rather than its appearance. Most candidates gave a suitable use for diamond in part (c).

7 This question was about detergents. In part (a) only about 50% of candidates gave the correct answer detergent. The majority of the remainder chose bleach. Candidates were able to answer the remaining parts well and gave the correct answers of optical brighteners (b) and to reduce the amount of energy used (c).

8 About 40% of candidates correctly identified natural gas as the source of hydrogen in the Haber process. Air was the most common wrong answer. Only 60% of candidates knew the meaning of the reversible symbol in part (b). The majority of candidates knew that unused nitrogen and oxygen was recycled and in part (d) most candidates were able to give other costs in making ammonia. Candidates should be advised to look at the mark for each question and provide that number of responses. It is clear in this question that several candidates thought one cost was sufficient and wrote about it in detail. The majority of candidates gave the correct answer, continuous in part (e).

9 Candidates were able to identify P as phosphorous and K as Potassium in part (a). However, in part (b) the majority of candidates failed to score. The main reason was that examiners did not accept 'to make plants grow' as a correct response. Plants will grow without fertiliser and the idea that examiners were looking for was to increase yield/ speed up growth / improve quality. About half the candidates recognised the apparatus as a burette in part (c) the remainder thought it was either a filter funnel or a pipette. This was surprising as it was targeted at grade E. Only the better candidates were able to answer parts (d) and (e). Both questions gave an answer of 80.

10 Candidates scored well on the first two parts of section (a) but in general failed to score on part (iii) Examiners were looking for the idea that the person became charged – by any sensible method eg riding in a car, clothes rubbing together, walking on nylon carpet etc and then touched an earthed object eg tap, goal post, radiator. It was targeted at grades E and G. It was surprising that less than half of candidates scored on part (b). Examiners were looking for the usual examples of paint spraying, photocopiers/ printers, defibrillators, dusters etc.

11 Section (a) caused a lot of problems for most candidates with only 8% getting these questions correct. The correct answers were D and A respectively but the 90% who got this question wrong put the answers in the wrong order, giving the smallest and largest *resistance*. In part (b) candidates generally correctly linked the terminal with its wire colour and knew that the earth wire was not needed for a double insulated appliance. The calculation (answer 2.5) was clearly understood and well done by the majority of candidates.

12 Most candidates identified beta as the other nuclear radiation in part (a) failed to score elsewhere in the question. Few candidates gave the correct answer x-ray to part (b) and similarly only about one third of candidates could give a correct use for gamma radiation.

13 This question proved difficult for the majority of candidates. Approximately 20% of candidates correctly identified the radiation as *background* radiation. In part (ii) again the same percentage were able to identify the nucleus as the source of the radiation. In part (b) (i) most candidates identified uranium as the fuel used in a nuclear reactor but again struggled to give the correct stages in the production of electricity in part (ii). Examiners were looking for straight forward answers of any one from energy source eg coal/ boiler / reactor for the first box and turbine / generator for the second box.

B624/02 Higher Tier

General Comments

This examination was the first Higher Tier examination for the new Gateway Additional Science B suite of specifications taken by candidates. Centres entry policy was very well targeted with only a small proportion of candidates whose performance suggested that they should have taken the Foundation examination paper.

The mean mark for the examination paper was 35.3 and the highest mark awarded was 57. The examination successfully discriminated between the target grades (A* to D); Statistical analysis shows that Section C (Sc3) was the most demanding and Section B (Sc3) the least demanding.

Comments on Individual Questions

- 1 This question was about decay.
 - (a) In part (a) a large number of correct answers was seen. Candidates who did not score did not compare the temperatures or refer to increased bacteria activity. A number of these candidates wrote 'it is hot in the summer', 'there is more light in the summer', or 'the heat makes it decay faster' and so did not score a mark.
 - (b) In part (b) a large number of correct answers were seen explaining that it was respiration from the decomposers that caused the carbon dioxide release. The main errors were (i) candidates referring to the decomposition or rotting of the grass cuttings (ii) vague descriptions of reaction between carbon and oxygen.
 - (c) Although Q.1(c) was targeted at standard demand, it was poorly answered by most candidates. A number of candidates were able to score a mark by describing the action of the earthworms in making holes or allowing more oxygen in. Few candidates were able to score two marks. Common responses which were not credited referred to the earthworms eating the compost, feeding on the compost or helping it to decay.
- 2 In this question candidates used data to calculate biomass and used the data in the food chain table to complete a pyramid of biomass. Q2 was the least demanding question overall in Section A.
 - (a) The vast majority of candidates were able to calculate the total biomass and number of individuals correctly.
 - (b) Excellent pyramids were drawn by the majority of candidates.
- 3 This question focussed on farming techniques.
 - (a) This question was targeted at high demand and few candidates were able to score two marks. A number of candidates were able to score one mark by correctly referring to eutrophication or fertiliser run off. The majority of candidates spoke about the cost of artificial fertilisers compared to growing nitrogen-fixing plants. No credit was given to candidates who considered the organic nature of growing nitrogen-fixing crops as being an advantage. No credit was given to candidates who suggested that a lack of crop yield would be a disadvantage.
 - (b) Although this question was targeted at standard demand it was only answered correctly by about 50% of the candidates. Candidates were unable to articulate the concept of maximisation of yield be it from animals or from a crop. A number of candidates stated that intensive farming was to produce more food.
 - (c) In part(i) a common incorrect response made by candidates was to state that the nitrate fertiliser contained proteins or amino acids. Some excellent answers were given to part(ii) by mainly high performing candidates gaining two marks for explaining that energy is required to move a substance from a low concentration to a

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high concentration. The majority of answers given by candidates were superficial referring to the transport of nitrates, food, oxygen around the plant. A number of candidates were able to score a mark for stating that the process requires energy. Candidates had difficulty in their interpretation of part (iii). Few candidates referred to increased water evaporation but a number of higher performing candidates spoke about increased water flow through plant. A common incorrect response was to state that the rate of photosynthesis is greater.

4 This question was focussed on the structure of a leaf.

- (a) Part (a) was well answered with the most common answer 'to transport water'.
- (b) A common misconception was to state that cells contain chloroplasts. A number of incorrect answers referred to the leaf cells absorbing light or having a large surface area. In part (b) a large number of correct responses were given.
- (c) Although part (c) was targeted at higher demand many candidates were able to answer this question correctly. Common incorrect responses referred to the leaves as thin or had a large surface area.
- (d) About 50% of the candidates were able to draw the cell correctly. The most common mistake was to draw the membrane separated from the wall but to draw things between the membrane and the wall.
- (e) Part (e) was a high demand question. Lower performing candidates gave a variety of incorrect responses. The most common incorrect response was to refer to lack of vacuoles. Some candidates confused the cell wall with a 'cell membrane' and others explained that 'an animal cell does not wilt'.

5 This question focussed on the allotropes of carbon.

- (a) The majority of candidates scored full marks on this part.
- (b) Part (b) was usually answered correctly in spite of it being set at high demand.
- (c) Well answered with many candidates explaining the idea of weak bonds between the layers to allow the layers to slide over each other. Weaker candidates did not score with statements like 'graphite has weak bonds', a repeat of the information given in the question.

6 This question was about detergents.

- (a) Very well answered by most candidates. Good answers included 'enzymes denaturing at high temperatures' and less energy needed so reducing the impact on global warming'.
- (b) Almost all candidates were able to correctly label the ends of the molecules. Weaker candidates tended to repeat the stem of the question 'water loving' and water hating'

7 This question was about the manufacture of ammonia.

- (a) Almost every candidate gave a correct response to part (a).
- (b) Part (b) was well answered with most candidates giving a correct response to parts (i) and (ii).
- (c) The majority of candidates were able to answer part (i) but few correct responses were seen to part (ii). Typically candidates commented that the higher temperature would increase the rate of reaction but made no comment on yield. Other candidates referred to a compromise but did not say between what factors.

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8 This question focussed on fertilisers and included a calculation.

- (a) The majority of candidates gave neutralisation as the answer to part (a).
- (b) The majority of candidates were able to calculate the formula mass. Incorrect answers were usually the result of incorrect additions.
- (c) The majority of candidates were able to score two marks for correctly calculating the percentage yield as 80%. There were a few '0.8' where candidates had not multiplied by 100.
- (d) Candidates for this examination are, in the main able to balance symbolic equations. A few lose marks because they cannot use subscripts correctly or are incapable of writing formulae correctly with capitals to represent elements. So would not be credited with a mark.
- (e) Few candidates realised that fertilisers increased nitrate and phosphate levels in water. Most candidates scored a mark for mentioning increased plant growth or that organisms die. Many candidates realised that the increased plant growth blocked light but a significant number of candidates thought that the fertiliser covered the water and blocked the light. The most common misconception that did not score was to refer to fertilisers killing plants and organisms. A number of candidates assumed that the fertiliser was a poison.

9 This question is about electric circuits.

- (a) Although Q 9 a(i) and (ii) were targeted at standard demand and was a common question on the foundation paper it was poorly answered by many candidates. Candidates looked at the diagram and assumed that a low resistance means a low current and answered A for part (i) and D for part (ii).
- (b) This question was set a standard demand and it was pleasing to see that the majority of candidates were successful in calculating the resistance as 2.5 ohms.

10 Candidates were asked to describe how particles move in a longitudinal wave. Only the most able candidates were able to answer this question correctly. A number of candidates were able to score one mark by describing the forwards and backwards movement. Few candidates described the particles vibrating and only a minority described the direction of movement. The most common misconception was to confuse the wave with a transverse wave and to describe the motion as side to side, or up and down.

11 This question was about static electricity and a use of electricity.

- (a) Most candidates attempted this question and good answers were usually about some sort of refuelling. Incorrect answers were about describing how a person gets an electric shock or about static electricity being useful eg defibrillators.
- (b) Part b(i) was found to be very difficult for weaker candidates. Many of these candidates made references to how the hair and water might react. A common response was 'could set the hair on fire'. A number of candidates forgot about the pads and skin and assumed that the shaved chest would enable the electricity to go straight to the heart.
Part(ii) was much better attempted.
Part (iii) was surprisingly badly answered by all abilities, the question did not discriminate. Many candidates concentrated on the patient and assumed the delay was to enable the patient to recover. A number of candidates in parts i), ii) and iii) kept referring to static electricity.

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12 This question was about nuclear radiation.

- (a) Q12 (a) was found to be the least demanding question on the paper. Only one or two candidates were unable to give a correct response
- (b) In Q.12(b) most candidates correctly identified x-rays as the correct response. A common incorrect response was the distracter ultrasound. Many weaker candidates just guessed an answer.
- (c) The calculation of half life in part (c) caused problems for weaker candidates. A number converted 960 into minutes then multiplied that number by 30.

13 (a) Q.13(a) was targeted at standard demand but only the most able candidates were able to answer this question correctly. A significant number of candidates did not attempt an answer. The majority of candidates responded by naming many different types of radiation from electromagnetic to longitudinal and transverse waves. A few candidates incorrectly mentioned 'helium atoms' or just referred to helium.

- (b) Q.13(b) was targeted at standard demand but was found to be very difficult. Few correct answers from weak candidates. The most common response was 'it contained too many neutrons' or 'it was too heavy.'
- (c) Q.13(c) was well answered. A number of candidates concentrated on the damage that alpha radiation might do to the body for which no credit was given.
- (d) Part (d) was a high demand question that only the most able candidates answered correctly. A significant number of candidates described the effect of x-rays on bones.

14 (a) Many weaker candidates did not write a response to part (a). Many candidates scored one mark for 'rods' but often incorrectly stated electrons were absorbed.

- (b) Q.14(d) was found to be the most difficult question on the paper. The question was targeted at standard demand so the response from candidates was surprising. Candidates stated that the metal absorbed radiation without qualifying what type of radiation. Many candidates just repeated the question and stated that the 'metal has become radioactive'.

Grade Thresholds

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 Additional Science B (Specification Code J641)
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Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
B623/01	Raw	60	-	-	-	37	30	24	18	12	0
	UMS	69	-	-	-	60	50	40	30	20	0
B623/02	Raw	60	48	40	30	21	15	12	-	-	0
	UMS	100	90	80	70	60	50	40	-	-	0
B624/01	Raw	60	-	-	-	35	29	23	17	11	0
	UMS	69	-	-	-	60	50	40	30	20	0
B642/02	Raw	60	47	38	29	21	14	10	-	-	0
	UMS	100	90	80	70	60	50	40	-	-	0

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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