OCR
RECOGNISING ACHIEVEMENT

GCSE

Science B J640

Gateway Science Suite

General Certificate of Secondary Education

Reports on the Units

January 2010

J640/R/10J

Oxford Cambridge and RSA Examinations

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of pupils of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support which keep pace with the changing needs of today's society.

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 specification 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.

OCR will not enter into any discussion or correspondence in connection with this report.

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

CONTENTS

General Certificate of Secondary Education

Gateway Science B (J640)

REPORTS ON THE UNITS

B621/01 Foundation Tier

1 General Comments

This paper elicited a good spread of marks across all three sections.

The Examiners set out to reward positive achievement if at all possible and it is pleasing to see that this has resulted in an increase in the mean mark on this paper.

Candidates are making more use of cues in the information provided to help them answer the questions. However, there were some general areas of weakness displayed by virtually all candidates.

Centres need to focus on the genetic aspects highlighted in Q.1b).

The inability to deal with the square function in calculating the BMI was also widespread, as was the difficulty in defining a hydrocarbon. Very few candidates could give two coherent suggestions for the reasons for global warming and the explanations of the cooling effect of volcanic eruptions very rarely secured marks.

2 Comments on Individual Questions

Q.1(a) This proved to be a reasonable start for most candidates; common errors were a tick in the middle column for large body mass and many thinking that 'shaved head' was linked to genes.

(b) The concept of inheriting characteristics/genes was poorly understood. Many candidates lost the mark for stating that Rob's daughter did not inherit any of his genes.

Q.2(a) The vast majority of candidates gained a mark for 'quickness' and a number went on to get the second mark for 'without thought' type of answers. Many merely repeated the 'pulls it out because it is hot' in the stem of the question.

The idea of protection was rarely seen.

(b) Poorly answered, skin was rarely the offered answer; hand, fingers or touch were the common wrong responses.

(c) Again 'hand' or 'touch' were common answers with CNS being seen less regularly but too often.

Q.3(a) A high success rate here, with 'temperature stick' or putting an ordinary thermometer on the forehead occasionally limiting answers to one or zero.

(b) Very poor responses on the whole. One mark answers were usually for oxygen but far too many candidates gave answers that were to do with perspiration rather than respiration.

(c)(i) The correct body temperature was fairly well recalled but the wrong answers varied widely.

(ii) Extreme responses about being killed or dying were often rewarded.

Q.4(a) A number of potentially good answers were undermined by

- lack of a comparative element in the response
- putting more protein and carbohydrates for energy
- having a list; more carbohydrates, protein, water, vitamins
- giving the expected answers but proposing them for 'Vicky'.

(b) A very low success rate here, candidates could not do a simple conversion of cm to m. Fewer still appreciated the mathematical technique of squaring and favoured multiplying by 2.

(c)(i) One answer from 'tar', 'tobacco', or 'nicotine' was more often seen than 'carbon monoxide'. A health problem other then heart disease was sometimes given as the answer.

(ii) A surprisingly low success rate for the style of question, with no discernable pattern to the incorrect answers.

Q.5(a) In this basic question most candidates could give two other ways of cooking chickens although some merely repeated 'oven' from the stem or gave 'on a fire and BBQ' and only scored one mark.

(b)(i) This part of the question was poorly answered; texture, taste, smell or just stating that the chicken was cooked all appeared in poor attempts. Better candidates could mention the irreversible nature of the process.

(ii) A much higher success rate.

Q.6(a) This question was very poorly answered.

The 'only' in hydrogen and carbon was omitted from many answers that gave half of what was required.

In the past this has often been a 2 mark question and candidates were found lacking in the ability to correctly give two ideas for one mark. Poor answers were 'gas', 'fuel' or a fuel from the list in (b).

(b) Generally well done, the poorer candidates putting coal or wood with one correct choice. A small minority gave a fuel (eg petrol) not in the list.

(c)(i) The majority of candidates were able to add 18 (H) to 8 (C) and gain the mark.

(ii) The fact that the candidates were heavily cued with C_7 H_{16} produced a reasonable level of success.

Q.7(a) Very few candidates failed to gain the first mark but the need to recognise the highest temperature **difference** prevented most from gaining the second mark.

The 'highest temperature at the end' was the most frequently correct, though incomplete, statement.

(b)(i) Combustion products were poorly known or recalled. Hydrogen and/or carbon were common wrong answers.

(ii) This mark was rarely awarded. Often candidates repeated the information in the question or put 'something yellow in the paraffin'. The 'allow' answers were more common than 'incomplete combustion'.

Q.8(a) The repeating of 'pipes' from the following parts of the question was seen far too frequently although most gained the mark for 'bags or bottles'.

(b) Repetition of the degrade part of the question indicated lack of recall of what it actually meant. However, there was a reasonable success rate.

(c) Many candidates gained the 2 marks here for 'strong' and 'will not break' / 'waterproof'. Poor answers gave uses.

Q.9(a) A very big majority gave the correct choice. Zero marks were usually for answering 'acid'.

(b) Again a well answered question, although some gave 'acid' or 'salt' from the list in (a).

(c) Well answered, often with a similar response to part (b).

Q.10(a) Most candidates gained 1 mark, and a small number gained 2. There were a number of vague references to smoke and pollution.

(b) Very few marks were awarded here. Candidates framed answers around lava (comes out of the Earth and is very hot, then cools, so Earth's temperature falls).

Q.11(a) Majority of the candidates scored with the idea of light being quicker.

(b) This produced a roughly 50/50 split, the incorrect responses being 'flashing', 'light' or 'signal'.

(c)(i)&(ii) Wave features were often poorly recalled. In (i) the trough (E) was often given but any letter could crop up, whilst AC/CD were frequent errors in (ii).

Q.12(a) Electromagnetic was almost never given as an answer but often candidates gave a correct example, usually infrared or microwaves. Wrong answers were spread amongst: analogue / digital / satellite / wireless.

(b) Not many correct answers were seen here and those that were, tended to be 'bounced' rather than reflected. The majority simply said it went to the TV, or wrote about 'Sky' or 'Freeview'.

(c) Generally well answered. Poor responses were a repetition of digital or some of the wrong answers to (a).

Q.13(a) The minority of candidates gained both marks. The problems were the choice and weak mathematics. 20000 ÷ 8000; 8000 ÷ 12000; 20000 ÷ (12000 – 8000) were just some of the answers illustrating lack of grasp of efficiency.

(b) A reasonable number marks awarded here, the common error was to gain the 'shiny foil' mark but reverse the correct order of the other two.

(c) This was the one calculation that was done quite well, possibly due to the simplistic presentation of the figures to be used.

Q.14 (a) Most candidates managed to tick one of the correct boxes.

(b)(i) Nearly all candidates knew this, 'J' being the infrequently wrongly selected.

(ii) Fairly well answered. Again the difficulty was with the comparison or thinking that the foil had something to do with it.

B621/02 Higher Tier

General Comments

The paper produced a mean mark of 28 and gave candidates the opportunity to show what they know, understand and can do. The paper produced the full range of marks and the standard deviation was 9.9. About 1300 candidates scored fewer than 15 marks and would have been better served by entry in the Foundation Tier. Examiners felt that the paper was at an appropriate level of difficulty. Most candidates could access the paper with only a small proportion of questions omitted. Questions 4(a), 8(c) and 13(a) all provided an opportunity to challenge the more able candidates and a number did rise to this challenge. There was no evidence of lack of time.

The chemistry section of the paper was less demanding than the biology and physics sections. The paper differentiated adequately with 35 marks required for grade A and 17 for grade C.

Comments on Individual Questions

SECTION A - MODULE B1

Question 1

This question about being healthy was the least demanding question in Section A.

(a) Approximately half of candidates gained both marks on this question. Many others gained 1 mark for the food type Mary should have more of, but failed to correctly link a reason to the food type. Some candidates failed to give a comparative answer (eg ‘Mary needs *more* carbohydrate for energy’) and lost marks.

(b) Candidates usually scored 2 or 0 marks on this question. Many candidates failed to convert 170 cm to 1.7 m and therefore did not score. Candidates who demonstrated correct working out, but did not calculate the correct answer of 21, gained 1 mark. It was clear that a significant minority of candidates did not have a calculator.

(c) Carbon monoxide in part (i) was not well known, with ‘tar’ being the most common misconception. In part (ii), however, the majority of candidates correctly identified nicotine as a stimulant. ‘Depressants’ and ‘hallucinogens’ were the most commonly chosen distracters.

Question 2

This question focused on neurones.

(a) Although this was a standard demand question, it was only well answered by the most able candidates. Many candidates still confuse the order of the relay neurone and the motor neurone. Other common errors included ‘spine’ instead of ‘spinal cord’ or references to ‘the brain’. A significant proportion of candidates did not attempt this question.

(b) Many candidates did not score on this question. Very few candidates appreciated that alcohol ‘slows impulses across the synapse’. Credit was given to candidates who knew that ‘alcohol is a depressant’. This area of biology continues to be poorly understood by a significant proportion of candidates.

Question 3

This question was about genetics.

(a) In part (i) only a small proportion of the most able candidates knew that both parents must be heterozygous. In contrast, many candidates correctly calculated the probability of attached earlobes as 25% in part (ii). '1 in 3' and '1:4' were common errors, which failed to score. Candidates who worked out the probability incorrectly, but drew a correct Punnett square or spaghetti diagram gained 1 mark.

(b) Approximately half of candidates could identify the correct statement. Some candidates ticked more than one box and failed to score

Question 4

This question about keeping the body in balance was the most demanding question in Section A.

(a) The majority of candidates failed to score on this question and a lack of understanding about how insulin controls blood glucose levels was clear. A significant proportion of candidates referred to insulin having a role in raising blood glucose level as well as lowering it or wrote about the breakdown of glucose. A small proportion referred to the conversion of glucose to glycogen for 1 mark, but failed to mention 'excess' glucose for the second mark. Any incorrect spelling of glycogen did not score. An equally small proportion of candidates gained 1 mark for knowing that this conversion takes place in the liver.

(b) Only the better candidates could identify homeostasis as maintaining a constant internal environment. Vague references to 'keeping everything in balance' did not gain credit. A significant number of weaker candidates omitted this question.

(c) A tiny minority of the most able candidates understood that insulin is made only in the pancreas because the genes are switched off in the other cells. Again, a significant number of weaker candidates omitted this question.

(d) Many candidates gained at least 1 mark for this question. The facts that anaerobic respiration does not use oxygen and produces lactic acid were the most common correct responses. Candidates who stated that anaerobic respiration 'uses less oxygen' did not score.

SECTION B - MODULE C1

Question 5

This question about crude oil was the most demanding question in Section B.

(a) Despite being a familiar question, many candidates failed to score the mark. A common error was the omission of the idea that a hydrocarbon *only* contains hydrogen and carbon. Other common misconceptions continue to be '*mixture* of carbon and hydrogen only' or 'a compound containing carbon and hydrogen *molecules* only'.

(b) Whilst the majority successfully placed the 'x' in the correct portion of the fractionating column in part (i), a lot placed it in the second portion of the column, at the top or outside the column. Only a very small proportion of the most able candidates gave a correct answer in part (ii). Most candidates confused 'properties' with examples of fractions from crude oil and the most common incorrect answer was 'petrol and/or diesel'. The term 'properties' remains poorly understood by candidates.

(c) The writing of a balanced equation was once again better than in previous years with over half of the candidates scoring at least 1 mark. It is pleasing that comments in previous reports about careful writing of formulae, including subscripts, have obviously been noted. One mark was awarded for the correct reactants and products and 1 mark for the correct balancing. The balancing mark was dependent on the correct formulae, but 1 mark was allowed for a balanced equation with a minor error in subscripts or formulae.

(d) The majority of candidates correctly explained what is meant by an exothermic reaction.

Question 6

This question focused on energy and fuels.

(a) The majority of candidates correctly identified petroleum spirit as the fuel that transfers the most energy to the water and then went on to gain the second mark for the explanation that it gave the largest temperature rise. A significant minority of candidates referred to the fact that it had the highest temperature at the end and did not score.

(b) Only about one third of candidates scored both marks for 6300J. Many candidates used the mass of the fuel rather than the mass of water and did not gain credit.

Question 7

This question about polymers was the least demanding in Section B.

(a) The mark scheme included a comprehensive list of properties needed for the plastic used to make water pipes and most candidates scored at least 1 mark. ‘Waterproof’ and ‘strong’ were the most common correct answers. ‘Cheap’ was a common misconception that did not score.

(b) The vast majority of candidates drew the correct structures of the monomer and polymer. A minority of candidates lost a mark by omitting the C – C bond or a C – F bond in the polymer or by omitting the brackets.

(c) The term unsaturated was not well known. Many candidates gave a definition of a hydrocarbon or discussed the ability to combine with other atoms, without mentioning the double bond.

Question 8

This question was about perfumes.

(a) Almost all candidates correctly chose ‘ester’ from the list.

(b) Almost all candidates could link the properties of perfume to the reasons why they are important.

(c) This question discriminated well, with the best candidates scoring both marks. Weaker candidates often scored 1 mark for the idea of weak intermolecular forces. The other mark was for either the idea of the forces between the particles being weakened or overcome or the idea that particles with lots of energy escape from the liquid. Many candidates that failed to gain credit simply described evaporation without any valid explanation. References to diffusion also failed to score.

SECTION C - MODULE P1

Question 9

This question was about changes in the Earth's atmosphere.

(a) In part (i) most candidates gave vague statements about carbon dioxide levels increasing which did not gain credit. The mark scheme required the idea of a rapid increase since 1800 or an increase after a long steady period. Again, answers in part (ii) were often not specific enough. References to global warming or the greenhouse effect were insufficient; it was the idea of an *increase* in these effects that was required. Similarly in part (iii) many candidates did not score because they failed to give a comparative answer such as *increased* population or *more* use of fuels.

(b) The majority of candidates thought that the Earth's temperature would fall because heat from the centre of the Earth was lost when lava was released from a volcano. More able candidates understood the idea that dust or ash from the volcano stops some heat reaching the Earth.

Question 10

This question focused on waves.

(a) Morse code was usually correct.

(b) Most candidates correctly described a digital signal, usually stating that a digital signal is either on or off or 0 and 1.

(c) The term 'wavelength' was not well understood. Most possible combinations of letters from the diagram were given as incorrect responses.

Question 11

This question about wireless signals was the most demanding on the whole examination paper.

Only the most able candidates scored any marks. Many candidates stated that long wave radio signals are reflected off satellites or off the atmosphere rather than the ionosphere. Some candidates realised that satellites were involved in digital TV signals getting back down to a receiver dish but usually wrote about reflection from satellites rather than transmission.

Question 12

The calculations in this question focused on keeping homes warm. This was the least demanding question on the examination paper.

(a) The vast majority of candidates correctly calculated the efficiency of the gas fire as 0.6 or 60%.

(b) Almost all candidates scored the mark for the payback time of 3 years.

Question 13

This question was about microwaves.

(a) The majority of candidates did not score on this question. Many candidates wrote about 'cooking the brain' with microwaves. Only the most able candidates stated that water or fat absorbs microwaves; fewer candidates were then able to explain that the water molecules vibrate more or gain kinetic energy. A significant proportion of candidates did not attempt this question.

(b) Many candidates still think of a 'microwave' in terms of a microwave oven, rather than a wave and discussed appliance-based ideas such as ill-fitting doors. The ideas of higher frequency, greater energy or longer exposure were not well known.

Question 14

This question focused on the ideas of heat and temperature.

(a) Most candidates were able to explain that the ice cubes were melting because the surroundings were hotter and/or the ice cubes were taking in heat. A common misconception was that the ice cubes were getting hotter.

(b) Only about a third of candidates knew that the temperature of the ice remains constant as the ice melts. 'Increases' was the most common misconception.

(c) The vast majority of candidates chose the correct words to complete the sentence.

B622/01 Foundation Tier

1 General Comments

This examination paper differentiated very well and allowed Foundation Tier candidates to demonstrate their knowledge and understanding. Only a very small proportion of the candidates would have been better suited taking the Higher Tier. Only a very small proportion of the candidates gave no response to a significant number of questions.

The mean mark for the paper was 30 and the range was from 0 to 55 marks out of 60. Section A was the most accessible and Section C the least accessible.

There was no evidence that candidates did not have sufficient time to finish.

2 Comments on Individual Questions

Question 1

This question was about sheep and was the most accessible question in Section A.

In part (a) most candidates were able to describe how the sheep are adapted to their environment by referring to the insulating nature of their wool coat and their use of sharp hooves to help climb the rocky hills. A small proportion of the candidates had the misconception that sheep were predators and they used the hooves to catch their prey.

In part (b) most candidates were able to suggest things that the sheep may be competing for. The most common correct responses were for food and for mates.

Candidates often managed to get two out of the three missing words in (c). They were most likely to respond incorrectly to the last gap regarding the increasing population. A significant proportion of candidates gave climate change rather than global warming.

Question 2

This question was about mosquitoes.

The majority of candidates in (a) were able to identify a mosquito as an animal and an invertebrate.

In (b) although a large proportion of candidates could identify the habitat candidates were less likely to identify the community.

All candidates found (c) very difficult and only a very small proportion of the candidates recognised that there was a new species of mosquito. Candidates very rarely used the correct terminology and a common error was to describe the mosquitoes as different breeds or just different.

Question 3

This question was about the Large Blue butterfly.

In (a) many candidates were able to describe the meaning of endangered. However some candidates only referred to a population that was decreasing which was not sufficient to be awarded a mark.

A large proportion of the candidates in (b) could interpret the life cycle diagram to identify the producer and the prey organism.

In (c) (i) most candidates identified the net as the most suitable piece of equipment. The pooter was the distracter most commonly quoted by candidates. In (ii) a large proportion of the candidates were able to interpret the life cycle diagram and the graph to suggest why the butterfly has become endangered. Most candidates referred to the drop in ant population but often candidates stated that the Large Blue's food had run out despite the graph still having an ant population.

Question 4

This question was about lichens and was the least accessible question in Section A.

A significant proportion of the candidates did not attempt (a) and those that did often wrote mould, moss or chloroplast rather than chlorophyll.

In (b) a significant proportion of the candidates did not attempt the question or were unable to state the name of a suitable food substance.

Many more candidates attempted (c) than (b) or (a). The mark scheme allowed for any reference to pollution however many candidates gave answers about the lack of light because it was close to a town and factories.

Question 5

This question was about the rusting of car bodies.

In (a) most candidates could give at least one other material used to make cars. The most popular correct answers were rubber, carbon fibre, glass and aluminium. Iron was not allowed since steel contains mostly iron.

In order to be credited with a mark candidates had to make a comparison in (b) but many failed to do this. For example, it was not enough to state that steel does not rust easily; there had to be a corresponding statement about iron. The most common correct answers were a comparison of strength and of rusting.

In (c) a large proportion of candidates were able to give two reasons: protection and decoration. Some candidates gave two reasons referring to protection and consequently gained only 1 mark.

Question 6

This question was about flour explosions and rate of reaction. It was the least accessible question in Section B.

In (a) a significant proportion of candidates did not attempt the question. A large number of answers were acceptable in the mark scheme, including heat, named combustion products and noise.

A significant proportion of candidates did not attempt (b) and, amongst those who did, few referenced the effect of surface area on the rate of reaction. Many candidates were confused about the idea of particles and considered the lump of wheat as a particle.

Question 7

This question was about the rate of reaction between calcium carbonate and hydrochloric acid.

In part (a) only an extremely small proportion of candidates could construct the word equation. This contrasts with similar questions in other examination papers where word equations are very accessible. Candidates found it difficult to fit all the names of chemicals into the space provided and often missed out at least one of the products. Candidates should be advised to write both above and below the lines provided for a word equation so they can maximise the space available for their answer. A significant proportion of the candidates did not attempt this question.

Most candidates could interpret the graph in (b) (i) and obtain the correct answer of 3 minutes. In (ii) only a small proportion of candidates could adequately describe that the line in experiment 2 was steeper. Many candidates wrote that the reaction finished quicker and this was not given credit in the mark scheme, candidates needed to write that the reaction finished in a shorter time.

Question 8

This question was about gases in the air.

In (a) the majority of candidates did not identify hydrogen as a gas not found in air and in (b) a similar proportion of candidates could not match the process with its effect.

Candidates often referred to killing plants or animals rather than the effect of acid rain on metals, buildings and statues.

Question 9

This question was about volcanoes and was the most accessible question in Section B.

Almost all candidates scored at least 1 mark for (a) and if they did make an error it was often that magma and lava were reversed.

In (b) very few candidates were able to give an allowable reason why people live near to volcanoes other than the soil is very fertile. Candidates often gave vague answers about being warm living near to a volcano. This was not given credit unless it was clear that the answer was referring to the use of geothermal energy.

Question 10

This question was about the electrolysis of copper sulfate.

In part (a) only a small proportion of the candidates were able to recall the process electrolysis.

Only a small proportion of the candidates were able to interpret the formula for copper sulfate. Some candidates gave the answer 3, presumably the number of elements or types of atoms in the formula.

Question 11

This question was about nuclear radiation.

In (a) a significant proportion of the candidates did not answer the question. The most common correct response was to treat cancer.

In (b) a significant proportion of candidates did not attempt either (i) or (ii) many candidates did get the correct answers. In (i) the most popular answer was to cause cancer. Many candidates referred to the use of protective clothing or the use of tongs in (ii). Keeping away from source was also a well known precaution.

In (c) although a significant proportion of candidates did not attempt the question many candidates were able to recall beta radiation.

Question 12

This question was about generating electrical energy.

Candidates found (a) (i) difficult because they had to give the two fossil fuels to get 1 mark. In (ii) candidates could get 1 mark for a correct renewable biomass fuel even if they identified an incorrect fuel as well. A common misconception was that natural gas was a biomass fuel.

The use of fuel rods in nuclear power stations was not well known and many candidates did not attempt the question. Hardly any candidate could recall that plutonium was a waste product formed at a nuclear power station whereas a greater proportion of candidates appreciated that heat was released by the fuel rods.

Question 13

This question was about the cost of using electrical appliances.

Many candidates in part (a) appreciated that the washing machine had the highest power rating and was on for a greater time.

In part (b) (i) only a very small proportion of candidates could calculate that the number of kilowatt hours used by the kettle was 0.5 kWh. An even smaller proportion of candidates in (ii) could calculate the cost of using the kettle as 6 p. A significant proportion of candidates did not attempt either (i), (ii) or both parts.

Question 14

This question was about photocells, the Sun and stars. This was the least accessible question in Section C.

In (a) a significant proportion of the candidates did not answer the question. Good answers used the bullet points to construct their answer. More candidates realised that electrical energy was produced than could recall that light energy was absorbed. A common misconception was that a photocell produces light energy or that solar energy was absorbed. Candidates rarely mentioned the longevity of photocells but often tried to explain that a photocell was non polluting.

In (b) a significant proportion of candidates did not attempt the question. Hardly any candidate gave an allowable answer. Common incorrect answers were that it causes fires, global warming or burns people.

Most candidates in (c) were able to recall that the Moon orbits the Earth. Only a very small proportion of the candidates referred to artificial satellites.

Despite both questions in (d) being prompted recall, candidates found the questions very difficult. In (i) the most popular answers were neutron star or supernova and in (ii) planetary nebula.

B622/02 Higher Tier

1 General Comments

- In general the paper was balanced and accessible to all candidates.
- Very few candidates failed to complete the paper.
- A few candidates had seemingly been entered for the wrong tier.
- Weaker candidates were able to recall knowledge and write a word equation. Stronger candidates were able to complete numerical calculations involving electrical power used and estimation from a line graph.
- The most able candidates provided a balanced equation, completed a calculation involving efficiency and the power wasted at a nuclear power station.
- Candidates need to be more aware of making comparisons to avoid losing marks.

2 Comments on Individual Questions

Q.1(a) Generally a well answered question. Most correct answers referred to more fat, only a few mentioned the idea of competition. Where candidates failed to score it was often due to reference to lots of fur/wool. Those that did say surface area to volume ratio often got it the wrong way round.

Q.1(b) This was also a well answered question.

Q.2(a)(i) Universally well answered.

Q.2(a)(ii) Many candidates were able to answer that parasites live off another organism but did not recognise the harm this causes the host organism.

Q.2(b) Many candidates correctly identified habitats but populations was less well answered, with candidates commonly mistaking these for classes.

Q.2(c)(i) Candidates found this a challenge and often wrote confused responses. Where a mark was gained it was often for the idea of a new species but very few linked this to the idea that the offspring of the *culex molestus* and *culex pipiens* would be infertile.

Q.2(c)(ii) Very few correct answers seen here. Reshma was the most common incorrect response.

Q.3(a) Most candidates scored for describing the effect on the ant population. A large number of candidates mentioned thyme plants in their answers or mentioned that the butterflies had no food left rather than a reduced food source so did not achieve full marks.

Q.3(b) Many correct answers were scored for describing the effects on food chains. Several also gave correct responses for either cultural or ethical ideas.

Q.4(a) This was generally a well answered question.

Q.4(b) Most candidates were able to complete the equation for photosynthesis but many failed to balance it.

Q.4(c)(i) Many scored at least one mark for the idea of indicating pollution. Many did not identify the relative distance from the source of pollution as a factor affecting lichen population size.

Q.4(c)(ii) A common misconception was that bushy and crusty were the same type of lichen but the differences were caused by pollution.

Q.4(c)(iii) Most candidates found this very challenging and only the very best scored this mark. Some managed to comment on the difference in surface areas but failed then to link that to absorption of pollution.

Q.5(a) Although most candidates scored, often for commenting that steel is harder, too many candidates failed to make a comparison and only stated a difference. A common misconception was that steel is lighter or cheaper.

Q.5(b) This was generally a well answered question.

Q.5(c) A common incorrect answer was that shape memory allows the glasses to fit the wearers face or that heat is required for it to return to its original shape.

Q.6(a) Although many did score, with carbon dioxide gas as the most common response, others responses such as energy, heat and sound were also seen. However, many answers were rather vague describing products formed without actually naming them.

Q.6(b) A common misconception was that the flour had been broken down or it had more particles.

Q.7(a) This was generally a well answered question.

Q.7(b)(i) Many candidates put 30, rather than the correct answer 15.

Q.7(b)(ii) Some candidates have been well prepared by centres and correctly linked the number of collisions to the rate. However, many just referred to 'more collisions' without any reference to the rate of these collisions.

Q.8(a) This question was a good discriminator. Only the more able candidates scored both marks. Correct balancing was rarely seen with using capital and lower case letters incorrectly a common error.

Q.8(b) Few candidates achieved full marks for this question. Most scored 2 for the electrodes but often did not correctly identify which type of copper was used. It was rare to see copper sulfate for the solution.

Q.9(a) This was generally a well answered question.

Q.9(b) Again a well answered question but some referred incorrectly to weight.

Q.9(c) Well answered with only a few getting size of crystal and rate of cooling the wrong way around.

Q.10(a) Most commonly one mark was secured for “gamma” and “yes”. It was rare for all three marks to be scored.

Q.10(b)(i) Many candidates wrote uranium instead of plutonium and steam for their first answer and therefore did not score.

Q.10(b)(ii) It was very rare to see all three marks scored. Often two marks were scored for 3000. The most common error was to calculate 1200 x 0.4.

Q.10(c) Many did not read the question correctly and wrote about fossil fuels instead of nuclear fuels. This led them to write their answers with disadvantages given as advantages and vice versa. Another common error was stating that it costs a lot without stating whether this refers to set-up or running costs.

Q.11(a) This was generally a well answered question.

Q.11(b) This was generally a well answered question and some also picked up the mark due to an error carried forward.

Q.12(a)(i) This was generally a well answered question.

Q.12(a)(ii) Many candidates mentioned cost in their answers and did not score as a result.

Q.12(b) There were many bizarre answers such as “the earth would blow up or catch fire” many seemingly linking it to effects seen following asteroid impact.

Q.12(c)(i) Often the answers to this question and the next one were the wrong way around.

Q.12(c)(ii) This question was answered better than (c)(i).

Q.13 This was a poorly answered question with a large number of candidates referring to planets rather than stars or galaxies. Many answers were badly structured and failed to make sense.

Grade Thresholds

General Certificate of Secondary Education
GCSE Science B Gateway (J640)
January 2010 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
B621/01	Raw	60	-	-	-	37	30	24	18	12	0
	UMS	69	-	-	-	60	50	40	30	20	0
B621/02	Raw	60	44	35	26	18	12	9	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0
B622/01	Raw	60	-	-	-	36	29	23	17	11	0
	UMS	69	-	-	-	60	50	40	30	20	0
B622/02	Raw	60	43	35	26	18	12	9	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0

Specification Aggregation Results

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

	Maximum Mark	A*	A	B	C	D	E	F	G	U
J640	300	270	240	210	180	150	120	90	60	0

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

	A*	A	B	C	D	E	F	G	U	Total No. of Cands
J640	1.3	8.2	26.3	58.8	89.4	95.4	97.9	99.8	100.0	624

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

Statistics are correct at the time of publication.

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

14 – 19 Qualifications (General)
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity

OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553