OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology B

Gateway Science Suite

General Certificate of Secondary Education **J643**

OCR Report to Centres

January 2012

J643/R/12J

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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 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.

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CONTENTS

General Certificate of Secondary Education

Biology B (Gateway) (J643)

OCR REPORT TO CENTRES

Overview

Candidates' performance in this session was broadly comparable with previous sessions. It was pleasing to see in candidates' responses that many had clearly made use of mark schemes or examiners' reports from earlier sessions. Candidates do however also need to be aware that simply repeating answers that may have been applicable in the past may not always be appropriate for similar questions set in different contexts. In addition, some of the often seen, and commented on, misunderstandings of the past are still appearing, for example, the notion that blood vessels can move closer or further away from the surface of the skin, was one of them. It is to be hoped that centres and future candidates will benefit from the comments in the reports on the individual papers.

B631/01 Modules B1, B2, B3 (Foundation Tier)

General Comments

The level of difficulty of the paper appeared to be appropriate for the ability range of the candidates, producing a good distribution of marks, covering almost the whole mark range available. All candidates appeared to have had sufficient time to complete the paper, with the majority attempting most of the questions.

The quality of candidates' spelling, punctuation and grammar was good, however there were a few cases where deciphering a candidate's writing posed a serious difficulty.

Question No.1

(a) The majority of candidates were able to correctly match nutrients to their job in the body. In part (ii) some candidates failed to understand the term 'proportion' and instead gave the number of chromosomes that came from the mother.

(b) Most candidates gave at least one correct answer. Common errors included carbon dioxide and water for the substance that reacts with glucose.

(c) Many candidates failed to understand that blood is under pressure so that it can get around the **whole** body and not just to a blood vessel.

Question No.2

(a) The majority of candidates were able to identify at least one substance. However some candidates gave nicotine as an answer which could not be awarded a mark as it was in the question.

(b) Most candidates can now correctly calculate BMI. However some still do not understand that they have to square the height. Nearly all the candidates correctly identified addiction as the answer to part (ii) and knew why drugs are tested in part (iii). When explaining why people object to drug testing candidates should be encouraged to give answers that explain that the testing is done on animals and that it is cruel. Vague answers such as 'They don't think its fair' or 'for religious reasons' cannot be awarded marks.

Question No.3

(a) In part (i) most candidates know that the body temperature is 37°C. Few candidates scored all three marks in part (ii). Many confused heat loss and heat gain. A number incorrectly referred to sweating. Also when the question asks about how bodies reduce heat loss candidates should be encouraged not to give answers such as wear more clothes. Few candidates were able to describe one other characteristic of a reflex action, most simply used different words to describe that it was automatic.

(b) Most candidates were able to interpret the graph in part (i). However in part (ii) they could not explain that alcohol reduces body temperature. Most went into more common reasons such as blurred vision and dizziness which was irrelevant in this case.

Question No.4

(a)   The majority of candidates knew the answer was habitat.

(b)   The majority of candidates successfully answered part (b). In part (iii) vague answers such as 'in zoo' or 'different habitats' could not be awarded marks.

(c)   Again most candidates could identify two other things they compete for. Although some candidates did repeat the idea of space given in the question.

Question No.5

(a)   The majority of candidates were able to interpret the graph for part (i). In part (ii) a number of candidates added the numbers together to give the incorrect answer of 1.1million. Also some candidates missed out the decimal points to give an answer of 5 instead of 0.5 million.

(b)   The majority of candidates thought the word finite meant it would not run out and gave the incorrect answer of wood.

(c)   Most candidates knew the name of one correct gas.

(d)   In part (i) most candidates gained at least one mark. However there are still a large number of candidates that think the hump is made of water. There were also a number who think that long legs help the camel walk on the sand. Candidates should also be encouraged to be more specific in their answers. They should use terms such as 'large feet' instead of just feet and say they stop the camel 'sinking' instead of 'help it walk on sand'. The candidates that gave incorrect answers for part (ii) tended to give examples of mammals such as cows.

Question No.6

(a)   Most candidates correctly answered photosynthesis for part (i) but did not know the name of the green chemical for part (ii). Glucose being a common wrong answer.

(b)   The majority of candidates correctly identified the habitat of a cactus.

(c)   Few candidates knew how to answer this question. Most tried to say count the cacti and then multiply the number by the size of the area. They had missed the point about collecting reliable results and should be encouraged to mention random placing of quadrats and repeat counts.

Question No.7

(a)   Few candidates identified the sex cells as gametes. A number picked up on the word join and gave the answer as fertilisation. More candidates knew that cloning is the process of making genetically identical cells.

(b)   The majority of candidates knew the function of the tail and the nucleus. However some candidates went back to the text in the box and talked about proteins needed for fertilisation.

(c) Few candidates could describe stem cells as undifferentiated cells. Many thought they were something to do with sperm cells or parts of a plant.

(d) Very few candidates gave the correct answer of meiosis.

Question No.8

(a) Many candidates incorrectly thought the blood went around the body from the right side of the heart.

(b) Few candidates identified the aorta in part (i). Most went for the pulmonary artery or vein. There were a number of incorrect answers to part (ii), the correct answer of platelets was rarely seen. A number of candidates mentioned fat or cholesterol. Most candidates were successful in answering part (iii).

Question No.9

(a) Few candidates were able to name all three correct. Haemoglobin being a common error.

(b) Candidates lost this mark because they did not mention concentration, instead they made vague comments such as 'the numbers are bigger'.

Question No.10

(a) Many candidates labelled the nucleus as the vacuole. They were more successful at labelling the chloroplast. There were a number of candidates that simply left out the question.

(b) The majority of candidates knew the shoots were growing towards the light. In part (ii) candidates either chose differentiation or division.

(c) A number of candidates went back to part B for their answer and incorrectly answered differentiation. Few candidates correctly answered mutation.

(d) Most candidates answered correctly, those that got it wrong ticked selective breeding.

B631/02 Modules B1, B2, B3 (Higher Tier)

General Comments

The level of difficulty of the paper appeared to be appropriate for the ability range of the candidates, producing a good distribution of marks, covering virtually the whole mark range available. More able candidates were able to demonstrate what they knew and understood, whilst questions targeted at grades C and D allowed all candidates access to the paper. Candidates appeared to have had sufficient time to complete the paper, with most attempting most, if not all, of the questions. The quality of candidates' spelling, punctuation and grammar was generally good overall and there were only a few cases where it was very difficult to interpret a candidate's writing. When doing calculations, candidates should be made aware of the importance of correct rounding of answers.

Comments on Individual Questions

Question No.1

(a) On this straightforward starter question, most candidates gained two marks for correctly matching the drugs with their actions.

(b)(i) Most candidates correctly calculated the BMI as 13.6. The common error was to fail to square the height.

(b)(ii) Almost all candidates recognised addiction.

(b)(iii) Most candidates gained the mark for explaining that the new treatment would need to be tested in case it was harmful or had side effects. A few gained the mark for saying that it needed to be checked that it actually worked.

(b)(iv) Most candidates gained a mark for explaining objections to animal testing along the lines of some people seeing it as cruel or unethical. Only a very few made the point that animals may not respond in the same way as humans.

Question No.2

(a)(i) Although many candidates gave vague statements such as $37^{\circ}C$ being the best temperature for the body, or its organs or cells, to work at, around a third did correctly link body temperature to enzyme activity.

(a)(ii) Although some candidates did gain both the marks for correctly describing vasoconstriction and how it reduces heat loss, they were in a minority. Some candidates ignored the instruction to describe the changes in blood flow and instead wrote about other mechanisms such as shivering. Some mistakenly thought that more blood, or a faster flow of blood, to the skin would help 'keep it warm'. Frustratingly, there are still a lot of candidates who think that blood vessels move away from the skin surface.

(a)(iii) Around two thirds of candidates gave the correct answer 'hypothermia'. Although phonetically correct answers are usually allowed, in this case 'hyperthermia' was not accepted. 'Pneumonia' appeared a few times.

(b) Most candidates gave the correct answer of 2 hours.

Question No.3

(a)   Most candidates gave a valid reason for having a different diet, such as different levels of activity, different ages or medical reasons. It was not enough to simply state that Nicholas played football or that he was active, without any reference to other members of his family, as this did not add anything to the information already given in the question.

(b)(i)   Only a minority knew that the missing part of the reflex arc was the motor neurone. Common incorrect answers included the brain, synapse or simply 'neurone'. A noticeable minority left it blank.

(b)(ii)   While a majority of candidates simply stated that impulses cross a synapse, a few did know about neurotransmitters and diffusion. 'Impulses diffuse across the synapse' gained no credit.

(c)   Some candidates ignored the instruction to write a symbol equation for respiration, and gave a word equation instead, which gained no credit even if correct. Relatively few candidates lost marks through the incorrect use of superscripts or case. When symbol equations were attempted incorrectly, marks were usually lost through incorrect numbers in formulae (usually for glucose) or balancing.

(d)   A majority of candidates knew that recovery after exercise involves removing lactic acid and many were able to explain how this happens.

Question No.4

(a)(i)   Being hunted or a lack of food, were the most commonly given reasons for orang-utans being endangered. Most candidates gained the mark.

(a)(ii)   Most candidates could suggest a valid way in which orang–utans could be helped. A variety of answers were commonly seen that suggested that many candidates knew what had been acceptable answers to similar questions in previous examination sessions.

(b)   Most candidates gained at least one mark, usually for giving one of the benefits as tourism, although other answers, for example the rainforest providing resources such as food, building materials or medicine, were also credited. About a quarter gained the second mark for a second benefit.

Question No.5

(a)   Less than half the candidates could demonstrably work out the population increase of 1 million (which gained one mark) and only a small minority could convert this to the percentage increase of 142.9%. The common error was to divide 0.7 by 1.7 or vice versa.

(b)   Over half the candidates knew that sulfur dioxide pollution leads to acid rain.

(c)(i)   This question about the ways camels are adapted to living in deserts was particularly well answered, with most candidates gaining the full three marks and indeed many candidates giving more correct answers than the three mark total would allow credit for. Where marks were lost it was usually through a lack of precision, for example 'wide feet to spread the load' would gain two marks, but 'their feet help them walk on sand' would gain nothing. A few candidates thought that the hump contains water.

(c)(ii) Almost all candidates knew that it's mammals that produce milk.

(d)(i) Although most candidates attempted the question, less than half appreciated the role of mineralisation in fossil formation.

(d)(ii) Less than half the candidates gained a mark for explaining why Lamarck's theory of evolution is now seen as incorrect. Only a very few gained full marks. Although many seemed to appreciate that Lamarck's theory has no genetic basis, answers were often not very clearly expressed. Some candidates referred to 'physical' or 'environmental' characteristics when they meant 'acquired'.

Question No.6

(a)(i) A majority of candidates gained both marks for a fully correct word equation for photosynthesis. When marks where lost it was usually through omitting one of the reactants or products, or including light in place of water or carbon dioxide.

(a)(ii) A minority of candidates appreciated that starch is better than glucose for storage because it is insoluble.

(b) Given the straightforward nature of the statements it was surprising that a mere handful of candidates could correctly identify which statements were true and which were false.

(c) Although most candidates identified at least one of the expected answers, that too few samples were taken or that the data might not have been representative, others failed to score through a lack of precision, for example 'the number of samples taken'. Some candidates stated that there could be more cacti in some places than in others, which was simply a truism. Some thought that all the cacti should be counted, which defeats the point of sampling

Question No.7

(a) Less than half the candidates could explain what a stem cell is.

(b) About half the candidates correctly stated that sperm cells are made by meiosis. Given that the usual incorrect answer was usually 'mitosis', this might suggest that many candidates were simply guessing which of the two it was.

(c) This was another question where a lack of precision often resulted in the mark being withheld. Only a minority clearly explained why sperm cells need to be haploid.

(d) Most candidates could give an acceptable reason why some people think it is wrong to obtain stem cells from embryos.

(e) It was clear from their answers that quite a few candidates knew that the triplet code was involved as the number 3 often appeared in their calculations. However only a very few could correctly calculate that 1737 base pairs would code for 579 amino acids.

Question No.8

(a) About a third of candidates correctly chose the aorta though a significant number thought that blood leaves the left ventricle through the pulmonary artery.

(b) A majority of candidates appreciated that the left ventricle has to generate a higher pressure, or pump the blood further, than the right ventricle.

(c) No credit was given for the idea, given by many candidates, that the battery might run out as this could apply regardless of where the battery and pump were situated. A few candidates appreciated that the wire passing through the skin opened up a route for infection. Credit was commonly given for the idea of physical damage, such as the wire being disconnected.

Question 9

(a)(i) Over half the candidates correctly identified glucose, fats and oxygen. However all options were regularly seen.

(a)(ii) About a third of candidates correctly explained how the direction of diffusion is determined by the difference in concentration. Weaker answers referred to amounts rather than concentrations.

(a)(iii) Two thirds of candidates could describe one way that the placenta is adapted for efficient diffusion. A large surface area or the idea of a short diffusion pathway, were the most common correct answers. For the latter answer, a 'thin wall' or 'one cell thick' were acceptable but 'thin cell wall' was not.

(b)(i) Half the candidates correctly calculated the percentage. Incorrect rounding was not acceptable, so marks were gained for 34, 34.3 or 34.29 but not for 34.0 or 34.2 for example.

(b)(ii) This question was designed to target the highest grades and although many candidates wrote about the passage of oxygen between mother and foetus (which was implied in the question), few gained any marks as they did not use the information to identify that the foetus had a higher percentage of red blood cells (or of haemoglobin) than the mother. Some did pick up on this but used it to incorrectly conclude that this demonstrated that maternal haemoglobin was passing to the foetus.

Question No.10

(a) Although most candidates correctly identified at least one structure found in plant cells but not in animal cells, only around half gained the mark for which they had to identify two such features. Some incorrectly chose features such as the nucleus or mitochondria, whilst a few made up structures such as 'cytoplasts'. Chlorophyll and cellulose commonly appeared but were not credited.

(b) About half the candidates knew the response was called (positive) phototropism.

(c)(i) Very few gained two marks, and only a minority gained one, for making the link between a mutation in DNA and a change in the proteins made in the plant.

(c)(ii) About a third of candidates correctly chose the option that plants gain height mainly through cell enlargement. The common error was to choose the first option about cell division.

(d) Although a minority of candidates appreciated that putting beta-carotene in rice is a way of ensuring people get more vitamins, only very few knew it was a way of providing vitamin A.

B632/01 Modules B4, B5, B6 (Foundation Tier)

General Comments

The level of difficulty of the paper appeared to be appropriate for the ability range of the candidates, producing a good distribution of marks, covering almost the whole mark range available. All candidates appeared to have had sufficient time to complete the paper, with the majority attempting most of the questions.

The quality of candidates' spelling, punctuation and grammar was good, however there were a few cases where deciphering a candidate's writing posed a serious difficulty. Many candidates found reading the scales on the graphs difficult resulting in loss of marks.

Question No.1

(a) The majority of candidates were able to correctly identify damaged fruit and potato peelings. Some candidates did get it completely the wrong way round and chose the cans and plastic bags.

(b) Most candidates were successful in answering this question.

(c) Many candidates understood that mixing would aerate the compost. However some simply said it would mix up the compost which was not credit worthy.

(d) Very few candidates understood that biomass comes from photosynthesis. Many thought it was respiration or decay.

Question No.2

(a) The majority of candidates were able to gain at least one mark. A few candidates used the term osmosis but incorrectly thought the whole process was osmosis so could not gain the mark. A large number of candidates thought the process was called respiration or photosynthesis.

(b) Some candidates were confused by the idea that two answers could be the same and tried to find a third alternative

Question No.3

(a) Only the more able candidates correctly answered parts (i) and (ii). In part (i) 100J was seen as common error and in part (ii) they tended to add the percentages together to find 40% of 1000. For part (iii) many candidates realised other energy was lost by the shrew or the caterpillar but not how it was lost. Candidates should be encouraged to use the term excretion or faeces instead of waste.

(b) Candidates either correctly answered insecticide or incorrectly answered herbicide for part (i). In part (ii) incorrect answers included pesticides or pellets.

(c) A few candidates knew that hydroponics involved growing without soil. However many thought it was to do with genetic engineering or mentioned growing in water but not mineral solution.

Question No.4

(a)   Most candidates gained both marks those that lost out chose sperm duct or oviduct as an answer.

(b)   In part (i) the majority of candidates knew the correct answer of fertilisation. Some candidates simply repeated the stem of the question in part (ii) by answering 'beats'. Others incorrectly thought the foetus was being checked. Common errors in part (iii) included various parts of the female reproductive system and the heart. A few candidates knew about positive and negative blood but the answer of Rhesus was only seen twice.

Question No.5

(a)   The majority of candidates were able to identify carbon dioxide; methane was seen on a regular basis as an incorrect answer.

(b)   Very few candidates could answer this question. Those that got close did not mention that it was the volume taken in one breath; they just said it was the volume taken in. Many candidates thought it was something to do with the amount of oxygen you could take in. Most candidates could correctly calculate the answer to part (ii) but not part (iii). In part (iii) they either took the difference as the answer (2.4) or they gave an answer of 50% with no working out.

(c)   Candidates should be encouraged to talk in terms of organ donors and not just dead people when they answer questions on organ transplants.

(d)   Few candidates knew the correct answer of mitosis.

Question No.6

(a)   Most candidates could give ball and socket as an answer but found it difficult to describe the range of movement.

(b)   The majority of candidates correctly identified at least one type of fracture. However they tended to mix up compound and green stick.

(c)   Few candidates gained all three marks for this question. Very few knew about ant-coagulants and a large number thought the fat or cholesterol cause the blocking of the blood flow.

Question No.7

(a)   Most candidates identified apples; some incorrectly thought it was grapes.

(b)   The majority of candidates knew that athlete's foot is caused by a fungus.

(c)   Few candidates could describe the process as fermentation.

(d)   Candidates that got this correct tended to answer in terms of preventing bacterial growth. Few realised it would prevent the growth of yeast. Incorrect answers included the opposite idea that it would help the yeast grow.

(e)   Biogas was the most common answer a few candidates correctly thought it was gasohol.

Question No.8

(a)   Many candidates incorrectly thought the answer was copper sulphate, few knew it was alginate.

(b)   Many candidates found the scale too difficult believing the change was from 98 to 39 to give an incorrect answer of 59. In part (ii) they often just described the shape of the graph and did not make the comparison with the free enzyme.

Question No.9

(a)   Few candidates were able to successfully answer this question. Many thought you could use the onion as a fungicide or mix bits of the onion with the banana. Only a small number of candidates mentioned genes or DNA.

(b)   Candidates tended to get this question correct those that lost marks did so because they simply said 'for growth'.

(c)   Few candidates recalled that springtails were detritivores in part (i). In part (ii) the most common error was to think that earthworms eat all the bacteria in the soil or act as decomposers.

(d)   Few candidates recalled that digesters are used to make biogas. Carbon dioxide was given more often than the correct answer of methane for part (ii). In part (iii) candidates should be discouraged from giving a cost answer as it is often wrong. Few candidates' correctly answer in terms of mains electricity.

B632/02 Modules B4, B5, B6 (Higher Tier)

General Comments

The number of candidates sitting this paper in January has continued to increase. This seems to have resulted in a wider range in the standard of scripts seen. There were certainly some excellent scripts but some candidates would have been better suited to a foundation tier entry.

It was encouraging to see that candidates were coming to grips with topics such as hydroponics, earthworm action and active transport. Candidates struggled in other areas, such as the understanding of the term vital capacity and the nature of *Entamoeba*.

Question No.1

(a)(i) This was generally well answered although a few candidates gave 100J as an incorrect answer.

(a)(ii) Many candidates failed to show any working so could not even score 1 mark. A common error was for candidates to do all the calculations based on the energy wasted rather than energy transferred.

(a)(iii) Many marks were lost with references to energy lost in growth and reproduction or just used up by the caterpillars and shrews. Weaker candidates gave the answer 'waste' without qualification.

(b)(i) The idea of bioaccumulation was clearly expressed by good candidates. Others showed some confusion with eutrophication or just referred to contamination of water. A small number gave advantages rather than disadvantages.

(b)(ii) This was generally well answered although weak answers referred to the control organism not eating any of the pest or eating other things as well. Again, a small number gave advantages rather than disadvantages.

(c) This was well answered by most candidates.

Question No.2

(a) Surprisingly few candidates answered in terms of root hair cells although references to increased surface area were more frequently seen. There were answers including big / thick roots, particularly from weaker candidates.

(b) Most candidates know xylem although few gave phloem as the answer.

(c)(i) A significant number of candidates lost marks by referring to too much water and cells bursting or needing to lose it. There were also references to turgor pressure without any real explanation.

(c)(ii) This was answered well but there were references to more water being needed for cooling.

Question No.3

(a)(i) Most candidates answered correctly but weaker answers referred to nitrates / nitrogen.

(a)(ii) Some weaker candidates did not score because they gave the substance and the bacterium the wrong way around.

(b) A good discriminator question.

(c)(i) Some candidates lost marks here by confusing either process with osmosis.

(c)(ii) Lack of precision, such as referring to more nitrates in the root rather than higher concentrations cost some candidates this mark.

Question No.4

(a) Generally well answered.

(b)(i) Answers here were disappointing, many referring to the total volume of air / oxygen in the lungs. Better answers explained in terms of total volume – residual volume.

(b)(ii) This was generally well answered.

(b)(iii) Many candidates gave an incorrect answer of 52%.

(c) This was well answered by most with ideas of rejection / shortage of donors. The idea of tissue match was also used by many but a significant number are still writing about blood type having to match.

(d) This was well answered with most candidates able to select the correct words from the list.

Question No.5

(a)(i) Many candidates correctly used the term ossification to describe this process. Weak answers confused ossification with ideas of osteoarthritis – with bones hardening and cartilage wearing away at joints.

(a)(ii) This was generally well answered with the vast majority of candidates identifying ball and socket.

(b) The terms osteoporosis and osteoarthritis were sometimes confused. Weaker candidates often just referred to bones getting weaker / softer as you get older.

(c) A number of candidates did not use the bullet points to guide their answer or left out the 1st bullet point as they were unsure of how to answer. A number lost marks by referring to ideas of clotting or thought that white blood cells would attack each other. A significant number thought it was fine to transfuse AB blood but not type O.

Question No.6

(a) Generally correct with 'uterus' being the most common incorrect answer.

(b) The most common error here was confusion between progesterone and oestrogen. This may have been poor spelling or candidates getting the 2 words confused.

(c) Very few candidates realised the link to adrenaline or hormones and most just thought the baby would respond to mother's heart rate / anxiety / nerve link through umbilical cord.

(d) This was a good discriminator – good candidates scored two but weaker candidates often only scored for the increase in pulse or breathing rate idea.

Question No.7

(a)(i) There were many vague references to sugar speeds up the reaction. Some confused this with the use of sugar as a preservative and mentioned killing bacteria. Another common mistake was to refer to improving the taste.

(a)(ii) Again, there were many vague answers, without links to idea of increased respiration / growth / fermentation or to enzymes at all.

(b) A significant number missed the instruction for a balanced equation and gave a word equation.

(c)(i) Generally well answered, except by weakest candidates.

(c)(ii) The most common mistake was that many candidates thought Entamoeba was a virus.

Question No.8

(a)(i) There were many correct answers although some referred to amylase / protease.

(a)(ii) By far the most common confusion here was between lipase and ligase.

(b) Marks were often lost by candidates referring only to effects on taste or vague ethics ideas.

(c)(i) There were few correct answers here with centipede being the most common wrong answer.

(c)(ii) This was well answered by most with many scoring two marks – usually for the aeration / drainage ideas.

(d)(i) There was much confusion here between biogas and gasohol with ethanol / alcohol / hydrogen often given as in correct answers.

(d)(ii) The better candidates appreciated the idea that biofuels produce no net increase in carbon dioxide pollution. Weaker answers only to refer to cost ideas or just less pollution with no qualification of this.

Question No.9

(a)(i) The answers 40 and 50 were seen quite frequently.

(a)(ii) A number of candidates just described the graph rather than comparing the two lines.

(b) There was significant confusion between sucrose / sucrase and between fructose / fructase. Other commercial brands were mentioned.

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