

Additional Applied Science

General Certificate of Secondary Education **J251**

OCR Report to Centres

June 2012

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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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A191/01 Science in Society (Foundation Tier)

General Comments:

This was one of the new series of examination papers that included longer six mark questions. Most candidates seemed to be well prepared for these questions and made a very good attempt at answering them. This resulted in almost all candidates showing what they could do on these questions.

However the trend for candidates to write outside the allocated areas is increasing. All too often candidates write in any white space that they can find. It is common to see most of the lines allocated filled with a repeat of the question, before the candidate even begins to answer it. This is a very dangerous practice that is on the increase. Due to the fact that these scripts are marked electronically, examiners do not see the whole page by default and unless there is some indication that the candidate has written outside the allocated window, it is possible that the examiner will fail to spot additional text and the candidate could lose marks. It cannot be stressed too strongly that candidates should attempt to contain their answers in the space provided.

The paper was suitably challenging and discriminated well between candidates. Very few sections were unanswered suggesting that the paper was accessible to most candidates. The length of the paper has been increased to fifty marks but there was no evidence that any of the candidates ran out of time. It was also pleasing to see a decrease in the number of no-responses.

Comments on Individual Questions:

Question No.

- Q1(a)** This question proved to be an easy start to the paper and most candidates identified A as the correct response.
- Q1(b)** Part (b) proved to be more challenging as candidates had to identify a drink containing two dyes with unique Rf values.
- Q1(c)** This should have been an easy question, however most candidates were unable to realise that any dye that had not moved from the start line must be insoluble in the solvent.
- Q1(d)** This was a two part question as it required candidates to first work out the Rf value of the banned dye, then identify the name of the dye from a table of data. Credit was given for each stage of the process. However the vast majority of candidates failed to carry out the instructions of showing their working and simply wrote down the name of the dye which in most cases was incorrect. Failing to show their working meant that they could not be credited for calculating the correct Rf even though they made an error identifying the dye from the table. It also meant that an error in calculating the Rf could not be carried forward by Examiners so candidates could not be credited with a single mark for correctly using the data in the table. Candidates need to be informed that when instructions say "show your working" it is for their own benefit.

Q1(e) It was pleasing to see that candidates made a good attempt at answering the first of the six mark questions. Most candidates were able to give a reasonable account of how they would carry out the process. However only the more able candidates went on to explain the science behind the process. Good answers included an account of dyes dissolving in the solvent, different dyes having different solubilities and some dyes moving faster with the solvent front than other dyes.

Question 2 was an overlap question with the higher tier paper.

Q2(a) Candidates performed reasonably well on this question with many scoring at least one of the two marks. Credit was given for any named practitioner that might work at a gym. Where marks were lost, it was usually for repeating the same job with a similar name, such as coach and trainer. Good answers included dieticians and physiotherapists.

Q2(b)(i) This was an unusual question in that the approximate answer of 66 was given to candidates who then had to show how this number was obtained. Credit was given for the correct calculation of the denominator and further credit for the correct completion of the calculation. Only the most able candidates managed to score both marks.

Q2(b)(ii) This question should have provided two easy marks. Candidates simply had to say that Mike was indeed in the average group for one mark, but only just as he was at the lower end of the range, to gain the second mark. Many candidates failed to remember that they had already been given Mike's result and often used their incorrect calculation to determine Mike's fitness.

Q3(a) This question was answered well by most candidates who were awarded both of the marks. Virtually all candidates managed to score at least one of the marks available.

Q3(b) Most candidates did not perform well on this question although many made valiant attempts and filled the space with writing. Most answers simply referred to strapping something on a person's arm and then taking a reading. Rarely was more detail given regarding the procedure or how the readings would be interpreted by a medic. This is one of the procedures which candidates could learn quite simply. Centres would be well advised to teach candidates simple definitions and procedures as this could be a simple way to ensure that candidates accrued many straightforward marks.

Q4(a) This was a straightforward sequencing question and most candidates performed well. Very few candidates failed to score at least one of the two marks available.

Q4(b) This question was well answered even though the candidates were not given labels to choose from. Common errors included substituting vagina for cervix or using the correct labels but in the wrong place.

Q4(c) This was also well answered by the majority of candidates. The most common error was to indicate implantation taking place in the fallopian tubes. Presumably this was because candidates were confused with where fertilisation takes place.

Q4(d)(i) Few candidates were aware that the most likely problem being experienced by Anita was pre-eclampsia. Most answers referred to stress or carrying out too much work.

- Q4(d)(ii)** Many candidates scored one of the two marks but a significant number failed to score. Good answers included scans, blood tests, monitoring weight and urine tests. Credit was given for either listing two relevant tests or for one test with a correct explanation.

This question was overlap with the higher tier paper.

- Q5** As an overlap question, it was intended to be challenging for foundation tier candidates. However there were many creditable responses that explained why the test was done, what the test was measuring and how the score was calculated. To be credited with Level 3 marks, candidates needed to state that each characteristic was scored 0-2, and that the scores were then totalled to give a mark out of ten and then explain what the score meant in relationship to the baby's health.
- Q6(a)** This question was worth three marks and required three independent steps. Firstly candidates were required to determine the actual length of the area by using the scale, secondly to calculate the actual area of the crime scene and finally to indicate that the units were m². The stumbling block for many candidates was to correctly use the scale to determine a length of 7m for the crime scene area. Many candidates assumed the scale was the actual length of the crime scene and thus lost marks. However the most serious mistake made by candidates was not to show their working. This meant that Examiners were then unable to credit correct scaling even if the final answer was calculated incorrectly. It cannot be stressed too strongly that when candidates are told to show their working, it is for their benefit.
- Q6(b)** Most candidates still do not fully understand the idea of error. The question simply required candidates to state that error could be caused by the operator making mistakes, or the instrument not being accurate and providing the wrong measurement. Credit was even given to those candidates who stated that using the scale could cause mistakes or even that the ground may be bumpy and it is hard to measure length over bumpy ground. Good answers were however few and far between.
- Q7(a)** This question was answered reasonably well with many candidates scoring some marks. Credit was given for any indication that the candidate understood the terms focus, contrast and magnification. Good answers included focussing to make the image clear, contrast to see the differences between different colours or shades and magnification to increase image size.
- Q7(b)(i)** This was an easy end to the paper and most candidates scored at least one mark for stating the age was over 195m years and many went on to gain the second mark for comparing the image to the conifer pollen grain.
- Q7(b)(ii)** Most candidates scored the final mark by stating that the information could also be stored as a written account or by video.

A191/02 Science in Society (Higher Tier)

General Comments:

This was the first time that most candidates had encountered Level of Response questions and many struggled to include enough science to achieve the higher levels.

Comments on Individual Questions:

Question No.

- Q1(a)** Most candidates could name or describe the roles of 2 qualified practitioners who help athletes with their training at the gym.
- Q1(b)(i)** The calculation of the fitness number from the given formula was generally well done with clearly laid out working. A few candidates made arithmetical slips and only a small number had no idea what to do with the numbers.
- Q1(b)(ii)** Candidates had more difficulty with using the data to categorise the fitness level from the fitness number ranges. Some used the pulse rates given rather than the fitness number and many just made basic responses such as 'yes he is average'. The better answers referred to the appropriate fitness number range and commented on it being only just within the average range.
- Q2(a)** The order of the stages involved in IVF treatment were well known with most candidates being completely correct. The most commonly misplaced stage was the hormone treatment which appeared at or near the end on a regular basis.
- Q2(b)** Explanations of the reasons for ultrasound scans, urine testing and blood pressure checks were often confused with many candidates not connecting possible diagnoses with the appropriate test. Some thought that it was the blood itself that was being tested rather than the blood pressure and others confused the health of the baby and the health of the mother. There were some good answers given for specific issues that would be detected such as gestational diabetes and pre-eclampsia.
- Q2(c)** Most candidates understood that the APGAR score was used to test the health of a new born baby although some thought it was repeated for weeks or months after the baby was born. Better answers used the table to explain the scoring for each observation with the stronger candidates going on to explain the significance of the total out of 10.
- Q3** Although most candidates could explain how the age and mass were used to find a point on the graph and understood that the chart was used to follow the progress of the baby, many struggled with the concept of the percentile lines and their significance. Answers stating that as the baby got older its weight increased were too common and others thought that the higher the percentile the healthier the baby.
- Q4(a)** Too many candidates struggled to calculate the area from the given diagram. Some struggled with the scale and others appeared to not have a calculator. A few candidates did not understand what was meant by 'units' and put a number instead of the units, or used m or cm².

- Q4(b)** Very few candidates understood the difference between a systematic and a random error and most just quoted examples of potential errors without specifying the type of error.
- Q4(c)** Candidates also struggled with the concept of accuracy and precision. A few understood that accuracy was the closeness to the true value but few had any idea about precision with answers based on reliability being the most common.
- Q4(d)** Candidates who understood that if uncertain measurements are multiplied together then the uncertainty will increase were few and far between. Many thought that the certainty would decrease due to errors in calculation.
- Q5(a)** Explanations of why detectives might choose an electron microscope were generally too simplistic and lacking in science. Explanations of the terms 'resolving power' and especially 'depth of field' were rarely correct, although better candidates showed they understood that they would be able to see more detail. The idea of it becoming easier to match or identify the pollen was also rarely seen.
- Q5(b)** Candidates were more successful in recalling some disadvantages of an electron microscope, including cost, lack of portability and destruction of living material.
- Q6(a)** Most candidates were able to identify at least one ethical implication of holding a national DNA database. Some focussed on practical issues such as cost or difficulty of obtaining samples, raising issues such as people moving to the UK.
- Q6(b)** The way that electrophoresis works is poorly understood with only the better candidates scoring anything on this question. Most marks were gained by realising that particle separation depends on differences in charge and/or size etc.
- Q7(a)** The concept of the Rf value in chromatography was better understood although some thought it equalled the distance moved by the solute alone. Better candidates were able to both recall the relationship and correctly calculate its value.
- Q7(b)** Few realised that other substances might have the same Rf value and so could not definitely identify the banned substance. Many discussed increasing the reliability of the test by repetition or thought that there might be errors in the process.

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