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General Certificate of Education

Science In Society 1401/2401

SCIS3 Exploring Key Scientific Issues

Report on the Examination

2010 examination - June series

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General Comments

The paper succeeded in separating the candidates effectively, although few were able to score highly with all their answers. Candidates appeared to have completed the paper without running out of time. There were some very weak responses to Question 7 (the essay question) but these were usually presented by candidates who had difficulty with the paper as a whole. However, some of the handwriting verged on the illegible; the examiners will always spend time reading a script carefully – often several times - but examiners cannot award marks to work they cannot read.

Many candidates wasted time copying out large parts of the question. This did not help their score. There was a tendency to use words like “affect” and “change” where greater precision (“increase” or “decrease”) would have gained marks. References to”CO_2 emissions” scored better than vague mention of “pollution”. Again, when commenting on a graph, many candidates lost marks by making general comments and omitting data. At this level, precision is the key to success, and hard data is expected wherever possible.

Only the most able candidates presented effective examples of Science Explanations and How Science Works in the longer answers, and too many answers consisted of vague assertions without any corroborative evidence. Candidates with more practice in reading and understanding the question, and providing a fully structured argument supported by clear facts (often drawn from the data in the stem of the question) will find this paper more achievable.

Question 1

In part 1(c)(i), many answers gave vague generalisations rather than referring to specific data and studies. Successful candidates focused more on the studies and less on the people involved in them.

Part 1(c)(ii) was often poorly answered; few candidates effectively contrasted cohort studies with other research methods, or referred to the legality or ethics of encouraging cannabis use in a trial. Vague comments such as “other factors affect the results” did not score well.

In part 1(e), many candidates lost marks by referring to “most of the studies” where a more effective answer was “6 out of 7 studies”. Marks were available to candidates who took a balanced view, as well as those who supported one side or the other.

Question 2

In 2(a)(i), most answers referred to the graphs; answers citing numerical data scored better than those referring to sources that ‘went up a lot’.

In 2(a)(ii), many candidates thought that hydro electricity was to do with waves or tides.

In 2(a)(iv) most candidates mentioned that the target would be achievable/realistic and referred to the short timescale available. Credit was also available for those who mentioned cost of installation, the efficiency of renewable sources, or nuclear energy.

In 2(a)(v), a variety of possible outcomes were accepted, but answers grounded on data from the graph gained better marks.

Few candidates scored highly in part 2(b). Many candidates who did well in the smaller questions, failed to realise that at least 3 well-supported points are needed to get 6 marks. Too many candidates made one point – very well – and then reinforced it. At this level the examiners expect candidates to show understanding of a range of relevant factors, especially in the higher-marking questions.

Question 3

Much of this question was answered well. Part 3(a)(ii) discriminated effectively; too many candidates referred to 'subconscious' brain activity when a link to autonomic processes, e.g. heartbeat & breathing while asleep, would have scored more highly.

Part 3(c) was also effective; those who did well referred to difference in gender, age & health, as well as the patient's possible hearing or language difficulties.

Question 4

In 4(a)(i), too many candidates assumed that the women had been divided into three groups (for some unstated reason) to do the test; only a few drew genetic diagrams (to show the range of possible gene combinations) which scored well.

In 4(a)(ii), some answers just referred to MET-MET being larger than the other two, without comparing those as well; answers with data scored better than answers without.

Many responses to 4(b) started well but only attempted to make one point; unwise in a 4-mark question. Few responses said that genes could be switched on or off by environment though many referred to child abuse and traumatic experiences, which might trigger their effects.

Part 4(c) was generally well attempted; most candidates scored at least 2 marks, but, again, many candidates only made one point in their answer to a 4-mark question.

Question 5

Most candidates got 5(a)(i) right; however, carbon monoxide is not a recognised greenhouse gas.

Many candidates struggled in 5(a)(ii); most got 1 mark for making comparisons or for the enhanced confidence with matching predictions, but very few referred to the different factors, initial conditions or assumptions inherent in different models. 'More data' or 'more accurate' did not score any marks.

In 5(a)(iii), most students realised that CO_2 emissions (at national level) are more easily regulated and measured than global temperature could be.

Part 5(b)(i) caused difficulties. Too many students thought that the crop waste continued to absorb CO_2 when underwater, or that CO_2, not carbon, was stored in the crop waste. Very few candidates referred to the photosynthesis that gathered the carbon into the crop before it was sunk in the sea; some gained credit by referring to the release of CO_2 if the waste was burnt.

When answering 5(b)(ii), too many students thought that submerging crop waste would create a significant rise in sea level. Some considered the secondary effects of moving the waste (extra CO_2 release); the better answers usually referred to loss of soil fertility (as trace elements are sequestered along with the carbon), possible sea bed pollution and the timeframe before the crop waste decayed.

Many answers to 5(b)(iii) did not give specific advantages and disadvantages but just expressed opinions that it would be better to do something about cutting down our CO_2 emissions rather than trying to get rid of them once they are there. As usual, lack of detail caused lack of marks.

Question 6

Part 6(a) was often misread; too many candidates explained why we might want to identify the animals, while the question was about choosing DNA to do so. Off-topic answers do not score well; read the question, please.

Too many generalised statements about probability, the animals' diet and possible illness offered in answers to 6(b)(i). Also, arguing backwards from the results is not an effective way of showing that the relationship between animal numbers and scat count is necessarily valid.

There was some confusion in 6(b)(iii) between the definition of 'recreational areas' for human activity, and potential recreation for the coyotes. Candidates were expected to make a clear case why there would be fewer coyotes in the recreational area, and not just assume that it must be so.

Most candidates understood the food web in part 6(c) clearly enough to get 2 marks here, but few managed a clear exposition linking a stated change in predator numbers (whether up or down) to a resultant change in prey and plant numbers, for the 3 marks. Several candidates suggested that the plants were mobile, or confused 'animals' as predator and prey; very few referred to 'producers'.

Question 7

Too many candidates think that peer review is done in order to share or repeat their experimental data/results rather than in order to publish papers. Peer review is not about repeating the experiments and checking the results, nor do the reviewers steal the others work. This was too often quoted as a reason why scientists do not like their work to be reviewed. Those who explained the process of peer review in some detail – particularly the need for respected reviewers with experience in that field – scored well. Others confused the peer review process with the work of NICE.

Objectivity was not always seen as a good thing. Candidates who listed and explained some of the temptations to 'massage' results scored well. Some candidates seemed to think that bias is an adjective so described reviews as being bias rather than biased; small errors in SPG were ignored but errors like this added up over the piece.

Some candidates seemed to make up their Science Examples, or just gave vague statements about some (occasionally un-named) scientist. Many referred to MMR and Autism, although relatively few candidates were able to give specific details about this controversy. The best answers often referred in some detail to the effects of Peer Review in possibly delaying really challenging new views of a field of study, mentioning Semmelweiss, Darwin, Newton, the Heliocentric model or (occasionally) the special arrangements that had Einstein's 1905 papers published before he had even achieved his Doctorate! These potentially contained much material on all four topics (peer review, objectivity, science examples and 'how science works') and gave candidates who quoted them every opportunity to shine.

Examples with more detail scored more marks. The best answers were balanced between an explanation of what Peer Review is, how Objectivity matters (and the temptations to ignore it), specific examples of both of these in action, and evidence of a clear understanding of how the science behind these concepts actually works.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.