AQA

LEVEL 3 CERTIFICATE AND EXTENDED CERTIFICATE

APPLIED SCIENCE

ASC3: Science in the Modern World
Report on the Examination

1776 & 1777
January 2019

Version: 1.0

General

Students were able to attempt all questions in the paper as there were very few un-attempted questions seen. In general, the mathematical calculations (questions **02**, **08.1** and **11.2**) were answered better than on previous papers. It appears that colleges have followed the previous advice given and have ensured that students have practiced basic mathematical calculations, such as percentages, during the preparation for the ASC3 exam.

The questions based on scientists (**04.1** and **12**) were not answered well by most students. As in the previous series, students were unable to apply their knowledge of the roles of scientists to the contexts in the question paper. As a result, they could not specify exactly what the scientists would do, such as 'conduct experiments', 'test' or 'monitor'. Most students used vague terms such as 'look at', 'study' and 'find out'. Many students were not able to name a geneticist as a scientist who studies genes.

There were fewer students using additional pages to complete the question paper and more evidence of students giving suitably succinct responses. This included the extended response question (**10**) where most students who achieved level 3 marks for this question (seven, eight or nine marks) managed to achieve these marks without the need for additional pages.

Question 1

01.1   This introductory question was well answered with 46% of students achieving both marks. Those who scored one mark generally achieved the first marking point but simply stated that the DNA was 'pasted' and did not achieve the second marking point.

01.2   84% of students answered this multiple-choice question correctly.

Question 2

46% of students were able to calculate the percentage of eggs surviving. Those who achieved one mark (a further 27%) had completed a percentage calculation but with the wrong data from the source: dividing the 13 surviving eggs by either 50 or 100 instead of the number of implanted eggs which was 25.

Question 3

03.1   14% of students were able to define germline genetic engineering correctly as altering the genes of a single cell zygote. Many students were allowed marks for using other descriptions from the source, such as 'a momentous operation'. Some students gave the answer required for question **03.2** and so were not given credit for the same answer twice.

03.2   89% of students achieved the mark here for stating that inherited diseases could be eliminated.

Question 4

04.1   55% of students did not know that a scientist who studies genes is called a geneticist, even though this term is used in the pre-release material. Although 'genetic engineer' was allowed, many students had given the incorrect answer 'genealogist', and some had given answers such as 'gene scientist' which were not given credit.

04.2   79% of students achieved the first marking point for using CRISPR-Cas9. Some students had stated that both scientists were studying embryo development when in fact this was a difference and was one of the answers in question **04.3**. A few students had even given this answer as both a similarity this question and a difference in question **04.3**.

04.3   76% of students were able to state that Mitalipov was altering defective genes rather than studying embryo development as the difference between the two studies.

Question 5

There were some good answers seen here and 48% of students achieved all three marks. Although this was often achieved using quotes from the source, it was clear that students had understood the reason why the author had referred to cosmetic surgery. 81% of students scored at least one mark.

Question 6

06.1   81% of students gave the correct definition of mosaicism from the source.

06.2   This was a difficult question requiring two ideas 'gene editing taking place' and 'after cell division' for one mark. 22% of students achieved the mark point. Most incorrect answers seen referred only to 'after cell division' without specifying what occurred after cell division.

06.3   65% of students achieved the mark here. Most had identified that the CRISPR-Cas9 was inserted alongside a sperm.

Question 7

07.1   41% of students gave answers about the peer review process which scored all three marks, with 92% of students able to achieve at least one mark. However, there was misunderstanding seen in many students' responses, such as stating that scientific articles are written by journalists, or that the reviewer is the person who does the amending rather than the author.

07.2   12% of students were able to identify why the article would not have undergone the process of peer review. Many students incorrectly assumed that if the author has some sort of credentials there is no need for peer review.

07.3   56% of students achieved the mark, mostly for 'avoiding bias'. Incorrect answers tended to refer to making the article more reliable.

Question 8

08.1   31% of students were able to use data from the source to calculate the total number of children born to the nearest million. Those who scored one mark (a further 24%) were able to perform the calculation but did not give the answer to the nearest million.

08.2   45% of students were able to give the two correct alternative methods of using donated eggs or sperm and pre-implantation genetic diagnosis, with a further 29% identifying one of these. Incorrect answers included organ enhancement, IVF and gene editing, suggesting that students had not read the question carefully.

08.3   61% of students were able to give an example of an appropriate social question. There was no requirement for this to be lifted from the source.

Students who did not achieve the mark had chosen quotes from the source which did not make sense such as 'who is right?', 'should we permit germline gene editing for their sake?' and, 'in which category would we put short stature, for example?'.

08.4   20% of students were able to identify an ethical issue. Credit was given for answers relating to the use of human embryos such as lack of consent, possible long-term health consequences and possible side-effects.

Credit was not given for 'playing God' or 'it's not natural' unless qualified in terms of the health and wellbeing of the embryo.

Question 9

3% of students achieved all three marks, with 76% of students achieving at least one mark. All three mark points on the mark scheme were seen equally, there was not one mark point that students were missing.

Question 10

This question differentiated between students well with a full spread of marks seen across the mark range, and the mean mark being 4.7. Fewer students wrote more than necessary and ran over onto additional pages. There were some excellent concise answers seen which achieved the full nine marks (3% of students). Following previous advice given, students appear to be more concise in making their points in this extended response question.

An 'evaluate' command means that students should include strengths and weaknesses in their answer. Students who commented only on strengths were unable to achieve full marks. Some students did not support their answer with examples of the language used and this limited their marks.

Students who achieved no marks had appeared not to have read the question properly. Instead of evaluating how effectively each author presents their opinion, these students had simply described the content of each article. Students are advised to read the extended response question very carefully to ensure that they are fully addressing the question in their response**.**

Question 11

11.1 53% of students were able to achieve both marks for suggesting why some diseases are called inherited diseases. 92% of students achieved at least one mark.

Incorrect answers tended to refer to diseases being 'inherited'. Students should be reminded that when describing the meaning of a term, the actual term itself should be avoided. Credit was given for 'passing down from parents to children' and 'faulty genes'.

11.2 49% of students were able to correctly calculate the total number of births in the UK each year. 3% of students achieved one mark for choosing the correct data but not providing the correct answer.

11.3 This proved to be a difficult question with 4% of students correctly stating that the total number of births might be lower than the estimated value because some children are not diagnosed at birth.

Incorrect answers tended to refer to either:

- 'the data being estimated'
- 'babies dying before or during birth': not realising that stillborn babies would still be counted
- 'babies being born but not registered': not realising that this data referred to the UK rather than a developing country.

11.4 85% of students were able to correctly identify one rare and one not rare disease using the data presented. 5% of students were unable to interpret data of the type '1 in 3500' and '1 in 1000' and correctly work out which was the rarer.

11.5 9% of students could give both correct reasons why the numbers of individuals with Down's syndrome and Duchenne muscular dystrophy are different. The answers required referred to number of babies born and life expectancy, but simply saying these were different was not enough. 46% of students achieved one of the correct marking points.

Incorrect responses tended to refer to one disease being 'more rare' or 'more common' which did not answer the question.

11.6 66% of students achieved at least one mark here. The higher-attaining students (17%) were able to verbalise the first two marking points better and appreciate that 'may not have symptoms' and 'might not have been diagnosed' were different (but linked) ideas.

11.7 There were some very well presented and logical arguments seen here from the higher-attaining students. 21% of students achieved all four marks.

 52% of students achieved at least three marks. The third marking point missed by these students was mostly the description of the sex chromosomes. Many of these students were saying that 'males had one mutation on an X chromosome' rather than that there was 'only one X chromosome to have a mutation on'.

11.8 28% of students were able to suggest that a DNA test would be needed to diagnose Fragile X syndrome. Incorrect responses referred to testing mental development and demonstrated that these students had not fully understood the information given about Fragile X syndrome.

Question 12

In general, students were unable to suggest appropriate roles for the scientists given. 32% of students achieved any marks here, despite similar questions on previous papers. Students should learn the general roles of as many scientists as possible and then practice giving answers which put these roles into different contexts.

Use of statistics

Statistics used in this report may be taken from incomplete processing data. However, this data still gives a true account on how students have performed for each question.

Mark Ranges and Award of Grades

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

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.
UMS conversion calculator