APPLIED GENERAL L3

APPLIED SCIENCE

ASC3 Science in the Modern World
Report on the Examination

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Overall comments

The majority of students were able to attempt all questions on the paper. However, there were generally more non-attempted questions seen than on previous papers.

Most students were able to answer the questions fully without the need for additional pages. Where additional pages were used for the extended response question (Q7), the response was often lacking focus. Most of the level 3 responses (7, 8 and 9 marks) were from students who had not needed to use additional pages. Centres should continue to encourage students to be succinct in their responses.

As in previous series, many of the answers failing to secure marks were direct quotes from the source material which did not answer the question being asked. Centres are advised to encourage students to always write an answer in their own words, unless the question specifically asks for a quote from the source.

Students appeared to be well-prepared for the type of mathematical calculations required in the ASC3 examination. The mathematical questions (particularly Q8.4, Q9.1, Q9.2 and Q9.4) were well-answered by most students. It was pleasing to see that centres had followed previous guidance and had practiced mathematical calculations in preparation for the examination.

It was disappointing to find that many students were unable to apply their knowledge of the roles of scientists to the context of space exploration, with very poor responses seen to the questions about scientists (Q3.1 and Q9.6).

Q1.1 (1 mark)

Most students were able to work out that Apollo 11 landed on the moon in 1969, by taking 50 years away from 2019 when the source was written.

Q1.2 (1mark)

Fewer than half of students achieved the mark here. Most incorrect responses had incorrect number of zeros on the correct answer of 3600 (million).

Q1.3 (1 mark)

Most students were able to select the correct answer in this multiple choice question.

Q1.4 (1 mark)

Almost all students scored the mark here. All answers on the mark scheme were seen with the most common answer being ‘sending people to Mars’.

Q2.1 (1 mark)

Over half of students were able to work out that, of the 30 attempts to land on the moon, fewer than two thirds had been successful, and selected the correct answer of 19 from the options given. The most common incorrect answer was 30.

Q2.2 (2 marks)

Almost all students scored at least 1 mark on this question. All answers on the mark scheme were seen, with 'communications failure' being the most common correct answer.

Q2.3 (2 marks)

Almost all students scored at least 1 mark on this question. Whilst direct quotes from the pre-release material were allowed here, students who only scored 1 mark, generally gave quotes that both hit the same mark point on the mark scheme (sensors under the space craft).

Q2.4 (2 marks)

Only around 20% of students achieved both marks. Most of these students stated that instruments on the undercarriage of the spacecraft would scan the terrain and make course corrections. Some students gave a direct quote from the pre-release material that did not answer the question. Many students quoted 'deliver robots to the moon' which does not answer the question about ways to increase successful landings. More able students could state that robots would be navigating the spacecraft.

Q3.1 (2 marks)

Many students could not describe a role of an exercise scientist working for NASA. Only just over half of students scored 1 mark, with only around 5% scoring 2 marks, despite a range of creditworthy answers on the mark scheme. Those who did not achieve both marks made simple statements such as 'make sure astronauts are fit and healthy', without giving a specific action such as 'monitor heart rate' or 'develop an exercise plan'.

Q3.2 (2 marks)

This question was well-answered by students, with over 90% achieving both marks.

Q4.1 (1 mark)

This proved to be a difficult question for most students, with fewer than 30% achieving the mark. Students who did not score the mark gave answers such as 'water is a possibility under the crust' which was not credit-worthy, since the question was asking for what evidence NASA have for this possibility.

Q4.2 (2 marks)

Almost three quarters of students were able to achieve both marks on this question, with over 95% achieving at least 1 mark. The most common incorrect answer was ‘water’ which could not gain credit since the question asks for ‘other’ conditions, with water stated in the stem of the question.

Q5.1 (1 mark)

Over 95% of students knew that high levels of radiation around Jupiter have prevented spacecraft from landing on Europa.

Q5.2 (1 mark)

Most students (almost 90%) understood the consequences that the radiation around Jupiter would have on the spacecraft.

Q5.3 (2 marks)

Over 90% of students achieved at least 1 mark, with almost half of students achieving both marks. Incorrect answers seen were generally not the ‘measurements’ asked for in the question, such as plumes of water or subsurface lakes.

Q5.4 (1 mark)

Around half of students achieved the mark here for saying Europa Clipper would make flybys in order to take measurements.

Q5.5 (2 marks)

Appricimately 40% of students achieved both marks, with around 80% achieving at least 1 mark. All answers on the mark scheme were seen. No mark was given for simply stating that the Jupiter Icy Monns Explorer mission ‘launches in 2022’ rather than making a direct comparison by saying how this is different from Europa Clipper i.e. ‘launches earlier’.

Q6.1 (1 mark)

Only around 10% of students achieved the mark on this question. Most students who did not score the mark gave a quote from the pre-release material which did not actually answer the question – for example‘filling a gap when government agencies such as NASA could not justify the spending’. To achieve the mark it was necessary for students to show that they understood what this meant i.e. lots of money spent on SpaceX.

Q6.2 (3 marks)

Almost all students achieved at least 1 mark on this question, mostly for exposure to radiation injuring astronauts. Just over 50% of students achieved all 3 marks.

Q6.3 (2 marks)

Over 60% of students achieved both marks on this question. The full range of answers on the mark scheme were seen, with 'better radiation shielding' being the most commonly seen correct answer.

Q7 (9 marks)

This question discriminated well across the range of student abilities. Good students were able to describe validity in terms of the website, author, dates and reference to experts in the articles. Good students were also able to describe the effectiveness in terms of promoting space exploration, style of language, use of scientific terminology, structure and length of the articles. Some students did not fully read the question and referred to the general public rather than post-16 students. Some students discussed only validity, and some discussed only effectiveness, and by doing so limited their marks to level 2. Some students limited their marks by not discussing all the sources. The weakest students tended to simply describe what was said in the articles without any reference to validity or effectiveness, and in some cases did not even mention the sources at all. It was disappointing to note that around 5% of students did not attempt this extended response question.

Q8.1 (2 marks)

This question was well answered. Approximately 80% of students scored 2 marks by interpreting the data in the table to give two correct facts about Mercury.

Q8.2 (1 mark)

Almost 70% of students achieved 1 mark for using data to work out that the planet closest to the Earth is Venus.

Q8.3 (1 mark)

Over 80% of students were able to correctly describe the relationship between the distance from the sun and the time taken to orbit the Sun.

Q8.4 (2 marks)

Almost 85% of students achieved at least 1 mark on this mathematical calculation. Some students did not achieve the second mark due to incorrect rounding.

Q8.5 (2 marks)

Many students found this question difficult, with less than half of students scoring at least 1 mark. Some students misread the question and referred to time taken to orbit the Sun instead of distance from the Sun.

Q8.6 (2 marks)

Appriximately 70% of students correctly suggested that Ceres is between Mars and Jupiter to achieve 1 mark. The more ableachieved both marks because they also demonstrated how they worked this out using the data.

Q9.1 (2 marks)

This question discriminated very well. Weaker students were able to achieve 1 mark for calculating that the number of years between the launch of Hubble and the publication of the data. The more able students achieved the second mark for correctly calculating the mean, with no incorrect rounding.

Q9.2 (1 mark)

This question also discriminated well with the more able students achieving the mark here. It was disappointing to note that almost 15% of students did not attempt this simple mathematical calculation.

Q9.3 (1 mark)

It was pleasing to see that around 65% of students achieved the mark here, demonstrating an understanding of the process of peer review.

Q9.4 (3 marks)

This question discriminated well with the higher ability students able to complete all stages of the calculation to prove that the JWST mirror has an area which is more than 7 times bigger than the Hubble mirror. Almost 80% of students achieved at least 1 mark.

Q9.5 (1 mark)

Approximately 30% of students achieved the mark here, with all answers on the mark scheme seen equally. Students who did not score gave vague answers about why a bigger mirror would make JWST a better telescope, such as ‘ see more of space’, ‘see a larger area of space’ or ‘see more things in space’.

Q9.6 (2 marks)

Less than 40% of students achieved at least 1 mark for this question on scientists, with only 8% achieving both marks. Many students could not name a material scientist as the person who does tests to determine what an item (in this case a telescope) should be made from. There have been questions on material scientists on several previous question papers. The most commonly seen incorrect answer for a scientist who studies the solar system using a space telescope was an astrologist.

Mark Ranges and Award of Grades

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