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Examiners' Report

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Introduction

This paper was structured in the same style as all the previous papers for the unit. The multi-choice section A provided a wide coverage of the specification and tested AO1, AO2, and AO3. In section B there was the usual opportunity for candidates to demonstrate their ability to assess strengths and weaknesses of an argument and score highly in AO3.

Section C was in the traditional style of two essays. A short stimulus was provided so all students had a context in which to start. In Q28 there was some excellent knowledge and discussion demonstrated about punishment. Candidates knew the purposes of punishment well and there were good well-balanced responses which included references to case studies, backed up with facts and information. Punishment, retribution, rehabilitation, deterrence – all were discussed frequently and successfully. Again in Q29 there were many good examples of well-reasoned answers that covered the main points well e.g. evolution, heliocentrism, Big Bang and creationism.

As in previous papers, many candidates were able to demonstrate a wide range of knowledge and understanding of the topics, but a significant number seemed under-prepared. Candidates were generally well able to meet the demands of AO2, both in multiple-choice and short-answer questions, as well as in the extended writing. For under-prepared candidates, the main area of concern is in AO3 where many weaker candidates scored relatively badly. Without proper training in this area, it is very improbable that a high score will be achieved.

Overall, the quality of written communication was very good. However, there were a number of candidates where the legibility of writing hindered interpretation.

Question 21

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21 From Source 1, identify **four** potential benefits of cold fusion.

1 reducing the demand for fossil fuels to produce electricity

2 limiters energy to be provided cheaply

3 eliminating the release of greenhouse gases into the atmosphere

4 be more reliable than renewable energy and less harmful than fossil fuels.



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Examiner Comments

This is an example of a good response which scores all four marks available.



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Examiner Tip

For questions which ask for a list, students can save time by being succinct in their answers. Direct quotes from the source can be used.

Question 22

Section B presents an opportunity for candidates to analyse the strengths and weaknesses of an argument as part of the assessment of AO3. Candidates ought to take account of this in their preparation for the examination. The actual scores achieved on this question indicate that there are significant numbers of candidates who have not yet assimilated the required knowledge and technique required for this style of question. As in previous years, a number of responses tended to ignore what the question was asking and instead gave their own opinions on the issue raised, rather than the evidence and arguments used by the author of the passage. Another strategy that some candidates have adopted is to learn the key terminology and to then use all of it rather inaccurately in their answer. This is an important area of this unit and time needs to be spent by the candidates on learning and understanding the concepts involved. To improve overall, candidates need to be able to distinguish between fact and opinion, and support this with examples of both. They must also be able to identify bias, and to be able to identify different types of argument. Another opportunity for prepared candidates was to identify the analogy of the mountaineers that was used in the passage, and to explain the weakness of this type of argument.

22 Assess the **strengths** and **weaknesses** of the evidence and arguments used by the author to consider whether endless energy from cold fusion is within reach.

The adaptation uses many facts ^{as evidence} such as "the EURCFusion Programme [...] has spent millions of pounds trying to achieve cold fusion". It also contains a few opinions such as "notable interest", "very modest equipment", and "simple seawater". Facts are stronger forms of evidence than opinions and by providing many facts the author uses ~~good~~ strong evidence. The author uses a casual argument in the third paragraph by claiming that the "inability to produce convincing results" led to Pons and Fleischmann losing their positions, ~~the~~ without backing it up with evidence. This is therefore a weak argument. Similarly, the argument by analogy in the concluding sentence is also weak as the author compares scientists to "mountaineers".



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Examiner Comments

This answer scored full marks for AO3. This response was made by a well-prepared candidate who demonstrated all of the skills mentioned above in the introduction. The AO4 mark was two.

Question 23

There were many different scoring points for this, and the majority of candidates scored highly here.

23 From your own knowledge, give **three** benefits of countries cooperating together in the field of nuclear fusion.

- 1 It means that the cost is spread, so one singular country does not have to risk bankruptcy to fund it.
- 2 It creates positive relations between countries, and could lead to more co-operative work in the future.
- 3 It eliminates competition, and the combined knowledge will make progress quicker.



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Examiner Comments

A good answer, scoring all three marks.

Question 24 (a)

This question required candidates to show they were aware of at least one source of greenhouse gases. Coal was the most common response. A minority of candidates misread the question and gave CO₂ as an answer. Other incorrect answers included petrol/diesel, as the question excludes fuels derived from crude oil.

24 (a) Apart from fuels derived from crude oil, name an energy source that leads directly to the production of greenhouse gases.

(1)

coal

Burning fossil fuels



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Examiner Comments

Coal is an example of a correct answer. Fossil fuel on its own would not have been sufficient.



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Examiner Tip

This type of question can be answered with a single word. Even on short questions, read the question carefully.

Question 24 (b)

The majority of candidates were able to state a source of energy which does not involve combustion.

(b) Apart from nuclear fusion, name an energy source that does **not** lead directly to the production of greenhouse gases.

(1)

a energy produced in nuclear powerplants by
nuclear fission.

(Total for Question 24 = 2 marks)



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Examiner Comments

A good example of one of the many possible answers. Nuclear energy on its own was insufficient.

Question 25

The theme of developing scientific theories is explicit in the specification, and regularly tested on this paper. The mark scheme listed six possible points that could be made to earn the four marks available. There was no requirement for candidates to name stages in a correct hierarchy. This meant that a number were able to achieve marks which might otherwise have been lost. Evidence and/or research were not accepted as alternatives to 'observation'. The question proved to be an effective discriminator. Responses showed clearly those candidates who had studied the topic and been well-prepared in how to produce a high scoring answer. Some candidates wasted time by writing about examples of scientific theories, and too many referred to evidence, so limiting the mark they achieved. A significant number referred to 'ideas' rather than 'hypothesis'.

25 Outline the usual stages in the development of a scientific theory.

First there is observation- Then ^a hypothesis is stated.
Then is the testing and experimenting process with
multiple test repeats. Then the results/ findings are
compared to the hypothesis. If they match it
becomes a scientific theory.



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The clip is a succinct answer which scored full marks.

Question 26

The World Energy Council's prediction is not supported by any facts in the passage. Most of the candidates went down the route of stating that new reserves may be found and that other energy sources could be used to reduce demand on crude oil.

26 Give **two** reasons why the claim 'we will run out of crude oil in forty years' is not certain.

1 *It is assuming that the rate of use will not change in that time.*

2 *This could change if other crude oil reserves are found.*



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Examiner Comments

Full marks scored on this, one for referring to the rate of use, and a further mark for the possibility of finding more crude oil reserves.

Question 27

Cold fusion is a very speculative idea, as the underpinning science is unproven. Aside from the difficulty of the science, however, there are many other factors to consider – and candidates were invited to discuss these reasons. The passage alludes to the possibility that scientists will fabricate results in order to further their personal interests, and candidates successfully developed this theme to score marks. The passage also leads candidates to discuss the political will of governmental priorities, as there are significant cost implications to continuing the research set against potential environmental benefits. More able candidates were able to make these points clearly, using well written prose set out in paragraphs.

27 Explain why attempts to achieve cold fusion are not simply a matter of science.

Money - cheaper
Fame - nobel prize

(8)

For all the big companies that supply energy, the matter of cold fusion is a matter of money. Because cold fusion has the potential to ~~be produced~~ produce a vast amount of energy for a low cost, it is an opportunity for businesses to make a lot of profit on it. This will also impact the people buying the electricity produced as they will also want cheap energy. It also has a ~~moral~~ ^{environmental} standing as it could greatly reduce the impact of climate change and so would improve the environment and the way people live as there would be ~~less~~ fewer nuclear and coal power stations that produce harmful by-products. For the scientists who are working on it there is the possibility of fame and further success if cold fusion was to be achieved. In the article it mentioned that there was an almost certainty that the scientist ~~s~~ who discovers

how to make it commercially viable would be awarded with a Nobel peace prize. This could act as ^{more of} an incentive to discover it than the actual ~~science~~ scientific discovery itself. The discovery would have a greater impact on society and everyday life than on the scientific community as the effects would be more long term and so it is being experimented with for ~~society~~ the benefit of society more than science



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Environmental and commercial considerations were the most commonly seen of the mark points in the mark scheme. Government manipulations, military involvement and scientists wanting Nobel prizes were also regularly mentioned. In this example, a mark was awarded in the first sentence for referring to costings (mark point A5). Further on, a mark was given for discussion of the environmental standing (mark point A8). Towards the end of the candidate's answer, marks were awarded for discussion of the motivation of scientists in terms of becoming famous for their discoveries and the possibility of being awarded a Nobel Prize. This example scored four marks out of a possible five for AO2, and two marks out of three for AO4 (quality of written communication).



ResultsPlus Examiner Tip

In order to maximise AO4 scoring, consider dividing large sections of writing into paragraphs.

Question 28

There was some excellent knowledge and discussion demonstrated about punishment in these essays. Candidates know the purposes of punishment well and there are well-balanced responses which include references to case studies backed up with facts and information. Punishment, retribution, rehabilitation, and deterrence – all were discussed frequently and successfully with AO1 and AO2 scores often being similar.

28 On Bastoy Island in Norway, the prisoners live in conditions critics brand 'cushy' and 'luxurious'. Yet Norway has by far the lowest reoffending rate in Europe, less than half that of the UK.

token
economy
systems

(Source: <http://www.theguardian.com/society/2013/feb/25/norwegian-prison-inmates-treated-like-people>)

Discuss the view that the primary purpose of imprisonment is punishment.

deteration ← → rehabilitation
unicapitation⁽²⁰⁾

The primary purpose of imprisonment is not necessarily to punish, but to deter an individual from wanting to re-offend on both an individual and general level. Once faced with rejection from society and the harsh nature of prison, individuals are less likely to want to be imprisoned again once they finish their sentence.

Many argue that the main reason an individual is imprisoned is to rehabilitate them, perhaps why Norwegian prisons are branded as 'cushy' and 'luxurious'. Many people believe that rehabilitation is much more important than punishment as it breaks the link between imprisonment and reoffending. If prisoners are rehabilitated and shown a 'better way of life' they become able to function better in society when they are released and are less likely to reoffend. This could suggest

Why Norway have the lowest reoffending rates in Europe, supporting the argument that the primary purpose of imprisonment should be to rehabilitate and not to punish.

However, many argue that the 'rehabilitation' practices in Norway prisons are simply teaching prisoners how to behave well as a prisoner, not how to behave / function in society. Norway prisons adopt the token economy system in which prisoners are rewarded for good behaviours, for example, cleaning their cell, through the distribution of tokens which they can exchange for 'luxuries' such as cigarettes. This does not necessarily rehabilitate offenders to help them cope with day-to-day life outside of prison, but simply teaches them how to behave in a prison setting. This potentially leads to offenders committing crimes simply to return to imprisonment as it is the only 'society' in which they fit in. Therefore, the primary purpose of imprisonment may be more effective as punishment rather than rehabilitation.

On the other hand

~~For example~~, it may be argued that the primary purpose of imprisonment is not punishment or rehabilitation, but incapacitation. Many argue that

prisoners ~~are~~ are incarcerated merely to protect society rather than purely as a form of punishment. The main interests of society is the safety of people rather than the concerns of the prisoner and therefore their ultimate aim is to detain anyone who shows that they are of harm to civilisation through the crimes they have committed.

In conclusion, it is unlikely that the primary purpose of imprisonment is to punish criminals when there are so many other important considerations such as the safety of society, decreasing reoffending behaviour, and rehabilitating those who clearly need help and support in order to change their criminal ways.



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Examiner Comments

This candidate has made a number of factual points (AO1 mark of four) which have been well-developed, resulting in a total of seven AO2 marks. A top score of four marks was given for the quality of written communication. The total score of 15/20 is of grade A standard.



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Examiner Tip

The essays represent a large proportion of the total marks, and it is vital to make best use of this scoring opportunity. A mark is awarded for each factual point that is relevant to the question, up to a maximum of eight marks (AO1 marks). Link your factual points to the question, using words and phrases such as 'therefore'/'so'/'because of this' in order to pick up AO2 marks.

Question 29

There were many well-reasoned answers that covered the main points well. A high proportion of candidates correctly referred to evolution, heliocentrism, the Big Bang and creationism. Strong answers included these and also mentioned the differences between the views of science and religion, or discussed areas where there is no conflict. Most answers included enough discussion of the AO1 points to score the corresponding AO2 mark.

29 To what extent do religious beliefs necessarily conflict with scientific discoveries?

(20)

religious beliefs can cause conflict with scientific discoveries, they may believe something is not right. Such as animals this could offend them as they are taught not to hurt others including animals.

however I feel that they choose to believe in it, it their 'choice'.

Science is more based on reality and what's going on around us, where as I feel religion can be used as an excuse or something to feel comfortable in.

science is based on facts + knowledge, religion is belief.

I feel annoyed when it comes to science vs religion, a. people who chose to believe in religion and are against science yet live in this world that science has helped them survive and have nice things.

An example of religion vs science is
How was the world made?
religion says Adam and Eve or
other scenarios, where as science
say big bang. & matter could
a big explosion happens.
No one can go against religion as
no one is certain if its make
believe or true.
Whereas science can be proven or
not proven.
Science can change the future
for the best so religion in
my view shouldn't get in the
way of it, however individuals
need to be respected.



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This candidate made some good factual points in their answer, for example the religious account of Adam and Eve and a scientific viewpoint of the Big Bang, and scored a total of four marks out of eight for AO1. However, very little development was attempted on the factual details, and only one AO2 mark was awarded. A score of two out of four was given for the quality of written communication. The total mark on this question was seven.



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Examiner Tip

In order to achieve your potential for the AO2 mark, end your essay with a well-constructed explicit conclusion in which you set out your summary with supporting reasons. To avoid losing marks unnecessarily on the quality of communication component of the assessment, pay attention to basic punctuation. Simple measures you can take are to start sentences with a capital letter, and use paragraphs.

Paper Summary

Based on their performance on this paper, candidates are advised to do the following:

Improve on the knowledge and application needed to achieve competency in AO3.

- Extended writing questions which examine AO3 typically have a question stem such as 'Assess the strengths and weaknesses of these different types of evidence and arguments, using examples from the source'. Candidates are unlikely to achieve the higher grades without developing skills in this area. There are numerous examples on past papers and mark schemes to illustrate these skills.
- Develop a strategy for constructing essays. Draft a plan with points for and against the argument.
- Include factual statements in support of their points. Develop these points further with key terminology such as 'so', or 'therefore' or 'because', or 'so what this means is'.
- Ensure that their writing is clear, legible, and of a size that can be easily read. Check that basic punctuation skills have been used, and extended writing is broken down into paragraphs.

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