

Examiners' Report  
January 2013

GCE General Studies 6GS01 01

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## **Introduction**

The majority of candidates answered all questions in each of the three sections of the paper. Maximum or near maximum marks were achieved by some candidates in each section. In section A, fewer marks than average were awarded for questions relating to scientific method, while higher than average marks were given for questions about crime and punishment. In section B, many candidates achieved maximum marks on individual questions requiring short answers but scored less well on questions 29 and 30, which required more extended answers. In particular, many answers to Q30 set out arguments about the merits of scientific research without discussing the strength of the evidence in the source material. Most candidates attempted both short essays in section C, suggesting that candidates are continuing to manage their time well. As in previous papers, marks for Quality of Written Communication (QWC) were awarded for the two longer answers in section B and the two essays in section C. Across the paper 14 marks out of 90 can be awarded for QWC. Some candidates lost a significant number of QWC marks because of poor spelling or syntax, or because their answer was not relevant to the question.

## Question 21

This question asked candidates to calculate the total budget for scientific research in the UK, using the information in the source. Almost all candidates were able to attempt an answer, but many failed to score marks because they only included the figure of 0.6% of the national budget, or because they calculated this figure incorrectly. A correct answer of £19.8 billion was awarded 2 marks. Answers which identified all three elements of the total figure, but did not give a correct final answer, were awarded 1 mark.

### SECTION B

Answer ALL questions.

You should aim to spend no more than 30 minutes on this section.

Read the passage on the separate insert and then answer questions 21 to 30.

- 21 Use the information in paragraph 1 to estimate the total funding allocated to science research in the UK in 2008.

$$\begin{array}{r} 600 \text{ billion} = 600\,000\,000\,000 \\ \times 0.6 = 3\,600\,000\,000 \\ + 2\,200\,000\,000 \\ \hline 5\,800\,000\,000 = 5.8 \text{ billion} \end{array}$$



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Examiner Comments

This answer gives the correctly calculated figure of £3.6 billion from the national budget and adds this to £2.2 billion from universities. However, the figure of £14 billion from businesses is not included so no marks were awarded.

- 21 Use the information in paragraph 1 to estimate the total funding allocated to science research in the UK in 2008.

$$\begin{array}{l} 600 + \cancel{14} \div 0.6 = 0.1 = 6 \times 6 = 42 \text{ million} + \\ 2.2 \text{ billion} = 2.62 \text{ billion} + 14 \text{ billion} \\ = 16.62 \text{ billion} \end{array}$$



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Examiner Comments

This answer was awarded 1 mark for including all three elements of the total, although the contribution from the national budget has been incorrectly calculated.

## Question 22

This question asked candidates to identify two sources of funding for scientific research mentioned in paragraph 1. Almost all candidates did this successfully. A small number of answers identified possible sources of funding which did not appear in paragraph 1 and did not gain any marks even if the answers were otherwise correct.

22 From paragraph 1, identify two different sources of funding for scientific research.

1 Research projects

2 Fund staffing



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Examiner Comments

These answers identify some uses to which funds may be put, rather than the origin of the funding, and therefore gain no marks.

## Question 23

This question asked candidates to identify a source of funding not already mentioned and to identify the area of scientific research which it supports. Most candidates were able to identify charities or public donations as sources for funding and then link these to a relevant area of research. Most commonly this related to research into diseases such as cancer or Alzheimer's.

23 Identify one source of funding for scientific research not mentioned in the passage and describe the area of scientific research it supports.

Pharmaceutical companies fund research into new drugs and therapies eg. drugs to cure cancer, dementia and other diseases which are becoming common in today's population.



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**Examiner Comments**

This answer was not awarded any marks because pharmaceutical companies contribute to funding from businesses already identified in the passage.

23 Identify one source of funding for scientific research not mentioned in the passage and describe the area of scientific research it supports.

People and charities collecting money for people suffering from illnesses such as cancer, so scientists can try and find new/improve medication.



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**Examiner Comments**

This answer correctly identified charities and cancer and gained 2 marks.

## Question 24

Candidates were asked to identify two benefits from the discovery of penicillin. Almost all candidates were awarded a mark for identifying the obvious benefit of saving lives or preventing infection. A second mark was available for linking the discovery of penicillin with the growth of the UK pharmaceutical industry. Only a small number of candidates gained this second mark.

24 From paragraph 3, identify two benefits resulting from the discovery of penicillin.

1 Many Millions would of died IF it wasn't found.

2 Still helping people today fight off infections.



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Examiner Comments

This answer gained 1 mark for linking penicillin to the saving of many lives. The second answer given still relates to the direct beneficial medical effect of penicillin and is making the same point so does not gain a further mark.

## Question 25

This question asked candidates to identify an area of scientific research and also to give a technological application arising from the research. Very few candidates managed to do both of these successfully. Many candidates gave answers which confused technology with science, or identified an area of scientific research which was not specific enough to gain a mark. Although single marks could be awarded for identifying scientific research without a technological application, no independent marks were given for just identifying an application.

25 Give an example of scientific research not mentioned in the passage and one technological application of the research.

Scientific research

Research by Marie Curie into radioactive elements

Technological application

This paved the way for Atomic ~~Science~~ and Nuclear Weapons.



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Examiner Comments

The area of scientific research identified here i.e. radioactive elements was considered to be specific enough to gain a mark. This research eventually led to models of atomic and nuclear structure which enabled the technological application of knowledge in nuclear weapons.

25 Give an example of scientific research not mentioned in the passage and one technological application of the research.

Scientific research

Stem cell research

Technological application

Smart phones



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Examiner Comments

Stem cell research was accepted for 1 mark. A valid application might have referred to stem cell therapy such as bone marrow transplantation.

## Question 26

Candidates were asked to identify a use of lasers not given in the source. Almost all candidates were able to do this and a very large range of applications was mentioned. In a small number of cases a mark was not awarded because the answer was too vague.

26 Identify one application of lasers not mentioned in the passage.

Used in medical treatments



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Examiner Comments

No mark was awarded for this answer because "medical treatments" is not specific. Use as a cutting tool, laser eye surgery or removal of skin blemishes were all awarded a mark as specific examples of medical treatment.

## Question 27

Candidates were asked to comment on the estimated figure of £14 billion for scientific research from private businesses. The great majority of candidates gained at least one mark for pointing out that private businesses were not obliged to supply figures such as these. A smaller number of candidates gained a further mark by identifying the large number of companies involved as a difficulty or by commenting on the difficulty of specifying exactly what spending is allocated to research.

27 Spending on research and development by private businesses is described as '...estimated...(to be)...approximately £14 billion' (paragraph 1). Explain why it might be difficult to give a precise figure.

It is difficult to give a precise figure because some companies may not share what they are doing research on to stop people from copying, therefore, we cannot know how much they have spent.



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Examiner Comments

This answer gained one mark for identifying the possible reluctance to publish figures by private businesses.

27 Spending on research and development by private businesses is described as '...estimated...(to be)...approximately £14 billion' (paragraph 1). Explain why it might be difficult to give a precise figure.

Not all companies will be willing to provide details of how much money they give to ~~research~~ research. Also it may be hard to track all companies that provide money to research.



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Examiner Comments

This answer gained both marks for identifying reluctance to publish figures and the difficulty caused by the large number of individual businesses involved.

## Question 28

This question asked candidates to identify the benefits of international cooperation in scientific research. Almost all candidates identified the sharing of costs as a benefit, and then most went on to give the sharing of research findings for a second mark.

28 Use information from the passage to identify the benefits of international cooperation in science research projects.

→ producing renewable energy through nuclear fusion



### ResultsPlus Examiner Comments

This answer gained no marks because it has identified an international research project rather than the benefit of international cooperation.

28 Use information from the passage to identify the benefits of international cooperation in science research projects.

The benefits of international cooperation in research projects are that high costs can be split between countries who may find it hard to fund on their own. Such as the UK and the US. Scientific knowledge gained from the research can also be shared.



### ResultsPlus Examiner Comments

This answer gained two marks identifying the splitting of costs and the sharing of research findings.

## Question 29

This question asked candidates to make a simple comparison between the two types of scientific research discussed in the source material. Those candidates who focused on making comparisons, for example between time scales or possible outcomes, were able to score maximum marks. Where answers did not make explicit comparisons, maximum marks were rarely achieved.

29 The passage refers to curiosity-driven research and applied research. Use information from the passage to compare their characteristics.

Curiosity driven research is when a scientist may believe something to be true, possibly based on previous evidence or observations from other experiments. The passage gives examples of curiosity driven research based on Fleming's discovery of penicillin, which was discovered by observing dishes from an experiment ~~based~~ looking into bacteria. If the experiment hadn't gone ahead, antibiotics wouldn't be what they are today. Another example was a theory from Einstein that was the bases of lasers.

Applied research is when there has already been research carried out in that area and the research is a continuation based on previous evidence.



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Examiner Comments

This answer describes curiosity based research at some length but only introduces a relevant comparison when it describes applied research as based on "previous evidence". Although the mark for content was limited to 1, a QWC mark of 3 was given because the whole answer is relevant even though it gained a limited content mark.

29 The passage refers to curiosity-driven research and applied research. Use information from the passage to compare their characteristics.

'Curiosity-driven' research is research into a certain area of science with "no immediate application or technological spin-off in mind". Applied research, however, is research applied to finding more information about a specific area of science we probably already have information about.

'Curiosity-driven' research is about making the initial discoveries that then lead on to applied research; hence why Carl Sagan refers to it as "the seed corn". 'Curiosity-driven' research occasionally leads to accidental discoveries, as with Fleming, whereas applied research is always planned; with a pre-determined hypothesis.



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Examiner Comments

This answer gained maximum marks for both content and QWC.

## Question 30

This question asked candidates to assess the strength of the evidence and arguments presented in the source material. As well as a number of clearly identifiable facts and opinions, the source also contained arguments from authority and by analogy and by induction. Candidate could gain marks by identifying any of these. Additional marks were also available for candidates who were able to make valid comments about the relative strength of pieces of evidence. Many candidates gained few marks for content because their answers discussed the value of the different types of scientific research mentioned in the passage, rather than discussing the strength of the evidence itself. Answers which gave no comment about the strength of the evidence also received limited QWC marks.

**30** The author uses different types of evidence and arguments to support the conclusion that the government should continue to fund curiosity-driven research.

Assess the strengths and weaknesses of these different types of evidence and arguments, using examples from the passage.

The author uses Alexander Flemmings discovery of penicillin to persuade the reader that money should be put into curiosity driven research, making his point that the best and most effective things have come out of curiosity based research. Persuasion by giving examples is a strength of an argument because it makes the reader see the one side of the story you want them to see.

A weakness of his argument is that he puts how much money the government put into research, which I think is a bad idea it limits how much the reader wants to side with the author because many people don't like the government to be spending money on things private companies could fund.

His examples ~~are~~ has to be a strength of his argument because he has used well known scientists like Flemming and Einstein and used 'Nobel prize winning' scientist which makes you trust the passage more because of their historical value.



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Examiner Comments

This answer received 1 mark for suggesting bias and 2 marks for QWC.

30 The author uses different types of evidence and arguments to support the conclusion that the government should continue to fund curiosity-driven research.

Assess the strengths and weaknesses of these different types of evidence and arguments, using examples from the passage.

The author uses fact when stating how much funding the scientific industry receives. This is a strong point as it is statistical accuracy that makes the passage seem more reliable. ~~The author also uses opinion as an example of this is through the use of words such as 'conclude'.~~ The author is careful not to use opinion, using objective terms such as "It could be argued," and asking rhetorical questions instead of stating ~~opinion~~. Carl Sagan's "seed-corn" quote is <sup>in itself</sup> an example of argument from analogy, and the author's use of quotes from scientists is an example of argument from authority. As both source scientists support the conclusion, this is a strength. ~~It is also an example of inductive argument.~~ The use of examples to support the argument are also an example of inductive argument — 'these examples are evidence that basic research is worth funding, therefore all basic research must be worth funding.' Use of three types of argument, statement of fact, and lack of opinionated voice ~~give this passage a strong~~ make this a strong passage and a good case for the argument.



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This answer gained maximum marks for both content and QWC.

### **Question 31**

Candidates were asked to assess the suggestion that we should limit car use and stop expanding airports. Most candidates were able to present at least some relevant comments and a simple argument or conclusion. Answers which scored marks at the lower end of the range were often limited to commenting on the issue of global warming raised in the question stem. Answers gaining average marks often also included some comment about the difficulty of deciding what constituted a necessary journey. Answers at the top end of the range considered a number of different perspectives relating to global warming, economic factors, the role of public transport and the impact of possible future technological changes such as increased remote working or carbon-neutral transport.

### **Question 32**

Candidates were asked to consider whether human rights could be described as universal and unconditional. Answers which scored marks at the lower end of the range often included an apparent misunderstanding of universality or unconditionality and also reached simple conclusions about the nature of human rights. Answers gaining average marks normally included some reference to human rights not mentioned in the question stem and related these to particular examples such as voting rights for prisoners, or the rights of refugees in various parts of the world. Answers at the top end of the range were able to illustrate the differences between entitlements and freedoms, as well as commenting on the limitations of universality and unconditionality.

## Paper Summary

Based on their performance on this paper, candidates are offered the following advice:

- When answering multiple-choice questions, you should read all four answers before choosing the one you think is correct. If you are not sure then try to eliminate the answers which you think are definitely wrong and then choose between the remaining answers. Answer all 20 multiple-choice questions even if you have to guess.
- The suggestions in the paper about how much to spend on each section reflect the marks available in each section. Section C contributes 40 out of the 90 marks for the whole paper, so try to spend about 20 minutes on each essay.
- In sections B and C, 14 of the available marks are for Quality of Written Communication. You can lose a significant number of marks for poor spelling, grammar or punctuation, especially if it makes it more difficult for the examiner to understand what you have written.
- When asked to select evidence from source material, you will not get any marks for quoting evidence which is not in the source or for giving your own opinion, even if the evidence is relevant.
- If asked to give 2 answers, do not put a list which contains more than 2 answers, because any incorrect answer will mean a mark is deducted.
- If you are asked to assess the strength of evidence in a source, you can gain good marks by quoting and identifying evidence as fact or opinion. You can also get marks for identifying and commenting on informal types of argument such as argument by analogy or argument from authority.

## **Grade Boundaries**

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