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Examiners' Report

June 2011

GCE General Studies 6GS01 01

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Introduction

As in earlier series most candidates were able to gain marks on most questions, including the two short essay questions at the end of the paper. A relatively small proportion of candidates achieved near to maximum marks for the multiple choice questions in section A. In section B, candidates sometimes failed to gain marks because their answers did not address the question, particularly in questions 26 and 28. These two questions together accounted for 14 marks out of 30 for section B. In both sections B and C candidates often failed to gain maximum marks for Quality of Written Communication (QWC) as a result of poor spelling or grammar. The number of candidates who failed to answer both short essay questions was lower than in previous series, suggesting that candidates are following advice about apportioning their time to the different sections of the paper.

Question 21

This is a straightforward question which requires the selection of relevant material from the source.

21 From paragraph 1, identify three problems associated with the number of vehicles in the UK.

1. The motorways and roads are "closed up."
2. Too much is being used meaning that it won't be sustainable.
3. It's increasing our carbon footprint and polluting the Earth.



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The answer numbered 2 is not complete. "Too much fuel" would have gained an additional mark.

21 From paragraph 1, identify three problems associated with the number of vehicles in the UK.

1. 30 million vehicles in the UK are using up shrinking resources and make a contribution to our carbon footprint.
2. The cars are being powered by petrol or diesel fuel, which is about 20
3. Cost of fuel and use of agricultural land.



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Although the 1st answer contains two separate correct points, examiners will not normally credit these points separately. The 2nd answer is wrong. The 3rd answer mentions "cost of fuel" which is not a problem identified in paragraph 1 and gains no mark. This answer also mentions "use of agricultural land" which would have gained a mark if the limited nature of this resource was identified.

Question 22

Most answers gained 1 mark for linking the 20% figure to the energy of movement of the car. A minority of answers gained the second mark for adequately describing what happened to the rest of the energy, either by describing a destination or means by which the energy was lost.

22 Paragraph 1 states that internal combustion engines are "only 20% efficient". Explain what is meant by this statement.

Only 20% of the 100% that goes in gets transferred to energy which makes the car move. 80% of the 100% is by product such as heat, noise and other energies.



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This answer gives a succinct explanation of the meaning of the selected phrase.

22 Paragraph 1 states that internal combustion engines are "only 20% efficient". Explain what is meant by this statement.

20% efficient means that in only 20% of cases the internal combustion engines have worked or been a success. It may also mean that the engines only run to 20% of their capacity and are therefore not very effective.



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Examiner Comments

Some candidates linked the figure of 20% to the number of cars which did or did not work or to the amount of carbon dioxide emitted or to the amount of fuel burnt. In this answer the suggestion is that only 20% of internal combustion engines work, which is clearly at odds with the description of crowded roads in paragraph 1.

Question 23

Most candidates were able to gain marks by selecting some of the information needed to answer this question. Only a minority of candidates were able to correctly calculate the final answer, with many incorrect answers based on adding or averaging the efficiency figures rather than multiplying them.

23 Using the evidence in paragraphs 1 and 3, calculate the overall efficiency of an electric car, assuming that the energy to charge the batteries comes from a coal-fired power station.

Electric cars are much more efficient themselves when running as they have a lower carbon footprint but how the electricity is produced is no better than burning any other fossil fuel in a traditional powered car.



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Examiner Comments

This answer contains some comments about efficiency but makes no attempt to calculate the overall efficiency. Where a calculation is required marks are not awarded for comments.

23 Using the evidence in paragraphs 1 and 3, calculate the overall efficiency of an electric car, assuming that the energy to charge the batteries comes from a coal-fired power station.

Engine efficiency = $4 \times 20\% = 80\% = 0.8$
Coal power station efficiency = $35\% = 0.35$

$0.8 \times 0.35 = 0.28 = 28\%$ overall efficiency



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This answer selects the two required percentages, identifies them correctly and uses them to arrive at a correct final answer. All three marks would have been awarded for a bare final answer of 28%, but candidates should show their working so that intermediate marks can be awarded if the final answer is wrong.

Question 24

This question asked candidates to identify how the efficiency of a fossil fuel power station could be increased. Most candidates were able to identify waste heat energy as a crucial factor, but failed to recognise the relevance of the description of such a scheme.

24 Explain how "a combined heat and power scheme" (paragraph 3) can increase the overall efficiency of a coal-fired power station.

The coal-fired power station is only 35% efficient, at turning the coal into electricity, and much of the remaining 65% of the coal is ~~wasted~~ ^{converted to} heat energy, which, at the moment, is not used. However, if the heat were to be harnessed, and used to heat nearby homes for example, then more of the coal will have been converted to useful energy, and this will therefore ~~raise~~ ^{raise} the efficiency.



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This answer correctly identifies the use of waste heat energy and explains how this could be used to heat homes, thus increasing overall efficiency.

24 Explain how "a combined heat and power scheme" (paragraph 3) can increase the overall efficiency of a coal-fired power station.

A coal-fired power station is typically 35% efficient, however, if the waste heat energy from burning coal is used in a combined heat and power scheme, this will mean that power will also be generated from this waste heat as well as from burning the coal. This means more power will be generated per burn meaning the power station is more efficient.



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This answer identifies waste heat energy as the source of any increased possible efficiency, but then describes how this can be used to generate more electricity, ie, power. The question refers to a "combined heat and power scheme"

Question 25

The majority of candidates gained two marks for identifying water as a waste product and the absence of carbon dioxide at any stage during the operation of a hydrogen fuel cell. Most failed to consider the relevance of the process to produce the hydrogen and oxygen initially.

25 Why might a hydrogen fuel cell be described as "carbon neutral"?

Hydrogen fuel cells would react hydrogen and oxygen together to create electricity and water is the only product in this process. Therefore ~~this~~ a hydrogen fuel cell is "carbon neutral" as carbon dioxide is not a waste product.



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This answer identifies water as the only waste product and the absence of carbon dioxide in the process in the fuel cell, but fails to consider how the hydrogen and oxygen might be produced.

25 Why might a hydrogen fuel cell be described as "carbon neutral"?

Hydrogen fuel cells maybe described as "carbon neutral" because the carbon emissions much come from the fuel may not be as harmful to the environment compared to others. They maybe more neutral due to the fact that they are derived from vegetation. Meaning the fuels are found in the ground and land. Meaning that it is a lot neutral compared to burning fuels and making an area polluted.



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This answer illustrates a misconception which was apparent in some cases in this and other questions, ie, that some carbon dioxide has less effect because it comes from a different source.

Question 26

Most candidates were able to select relevant information about alternative fuels from the source material. Some candidates lost marks because they also included irrelevant material about electric cars or hydrogen fuel cells.

26 From the passage, identify possible alternative fuels for use in internal combustion engines, and assess their advantages and disadvantages.

The passage mentions the biofuel, bioethanol, a fuel derived from vegetation, that claims to be 'carbon neutral'. This is good for as it is both environmentally and economically friendly, however the use of agricultural land and deforestation somewhat cancels out the benefits. Unless some sort of reforestation programme is devised this is not a good option environmentally. Furthermore the passage doesn't say anything about the efficiency of biofuels. It also ignores the efficiency values for hydrogen gas. And although this option sounds eco-friendly, it could only reduce carbon emissions if it could be produced from water by electrolysis, using electricity from renewables or nuclear power stations. This would mean additional electrical production, to combat ^{an} the issue trying to solve ~~electra~~ help the environment by finding alternate ways of ~~the~~ producing electricity, which is clearly shooting the problem in the foot. In any case, the highly pressurised hydrogen gas containers would be dangerous in a car and there are problems with refuelling.



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This answer identifies biofuels and hydrogen and paraphrases the information from the source to gain 3 marks. Some additional relevant comments which are not found in the source, for example about the efficiency of the fuels, gain 1 extra mark. Although the answer includes some crossing out, the ideas are presently very clearly using generally good grammar so a QWC mark of 3 was given.

26 From the passage, identify possible alternative fuels for use in internal combustion engines, and assess their advantages and disadvantages.

An alternative to an ICE is the electric motor, these are 80% efficient, so when they are moving they are producing less CO₂. But when they need charging electricity from an inefficient source needs to be used which is a major drawback. Furthermore these vehicles have a 'very low range' (they can't get as far) and 'long charging time' this may cause major inconvenience for the driver as they might need to go on a long haul journey and may be forced into other methods of transport. Overall the electric engines are an exciting prospect and will improve vastly as the technology available becomes more advanced.

Public transport is mentioned in the final paragraph but it is severely opposed, because it costs a lot of money for non-pensioners to travel. But a lot of people get onto one bus or train.



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Examiner Comments

This candidate has failed to identify "alternative fuels" as the central issue and has instead presented an answer about the alternatives to the combustion engine. The answer gained no marks for content. Candidates should also be aware that no QWC marks are awarded if the answer is not relevant to the question, as is the case here.

Question 27

Most candidates were able to identify the obvious analogies in the source but only a minority could identify the characteristics of an argument based on analogy. A small number of candidates were able to describe Plato's "Analogy of the Cave" but managed to do so without identifying any characteristic of this type of argument.

27 (a) What are the characteristics of an argument from analogy?

(2)

Analysing a situation by comparison to a similar situation.

(b) Identify an argument from analogy used in the passage.

(1)

'Any addiction needs a cure of a fix'

(Total for Question 27 = 3 marks)



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Examiner Comments

This answer succinctly identifies two characteristics of an argument from analogy and also refers to part of the argument used in the source.

Question 28

As in previous series, most candidates failed to discuss the "strengths and weaknesses of the evidence" in a way which would allow them to gain more than 2 marks for content. Most candidates chose to focus on arguments for or against alternative fuels or electric cars rather than the nature of the evidence in the source.

28 The writer concludes by saying that we can fix the problems associated with our use of cars. Assess the strengths and weaknesses of the evidence given to support this conclusion.

~~The writer~~ There ~~is~~ is a lot of hypothetical evidence given in the passage; a lot of 'if's' and 'but's', 'this might work', 'let's give this a go'. However I don't think there is much evidence to suggest a definite turning point, a solution to the problem. ⁷

The writer talks of replacement fuels for ICEs (biofuels, such as bioethanol, and hydrogen gas), but neither of these have advantages outweighing the negatives. Each have fatal flaws to their becoming an acceptable alternative to petrol or diesel, in accordance with the passage.

The writer does speak of another option which seems to be a good suggestion; electric motors. These battery powered ~~no~~ engines are a lot more efficient than the current ICEs, but again there is a flaw. They require recharging regularly, which means using ~~carbon~~ coal-fired power stations to run the batteries. This ~~means~~ ^{brings} the efficiency write down from 80% to just 8% more than petrol or fuel.

Unless an alternative fuel can be found to replace the coal-fired power station it's back to square 1. So it looks like there's no happy future in sight just yet for the ~~or~~ of today.



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Examiner Comments

This answer discusses particular aspects of the conclusion in the source in a general way, without identifying any pieces of evidence as fact or opinion. The answer is relevant and 3 marks were awarded for QWC, but only 2 out of a possible 4 marks for content.

The ~~conclusion~~ conclusion gives birth to many weaknesses. There is ~~no facts~~ or are no opinions given in the text ~~to~~ by experts therefore the argument is weak in its approach. On the other hand, the conclusion ~~is~~ supported by the high level of statistics included, thus giving a holistic viewpoint and agreeing with the conclusion.

Further, the text gives factual information, such as, '30 million vehicles in the UK are using up our shrinking resources', which provides evidence that there are problems associated with cars. However, is this really ~~an~~ a fact, or is it an opinion? There is no real evidence to say whether this is an actual fact.

Many alternatives are given in the text, ~~so~~ for example, using public transport, use of hydrogen fuels and biofuels. The fact that the writer has suggested other alternatives provides evidence that we can fix problems associated ~~to~~ with the use of cars by searching for other alternatives. Furthermore, ~~this~~ the piece of text is showing a one-sided argument from only ~~the~~ one person - the ^(Total for Question 28 = 7 marks) writer. ^{Other influential people commenting may give} Includes 3 marks for Quality of Written Communication

~~Support~~ for the conclusion, however other people's ~~to~~ opinions are not conveyed here making the ^{conclusion} ~~weak~~. **TOTAL FOR SECTION B = 30 MARKS**



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Examiner Comments

This answer was awarded maximum marks for both content and QWC. Candidates who failed to identify relevant information from the source as fact or opinion were limited to 2 marks for content.

Question 29

This short essay question asked candidates to consider what can or should be done to preserve animal species. Questions concerning animals in previous series have often evoked responses which focus just on the issue of animal testing. For this question most answers stuck to the point of the question. Candidates who scored well were generally able to discuss the threat to particular species in relation to evolution and survival of the fittest. Argument relating the effects of various human activities, for example hunting or deforestation, to the survival of some species was often extended to add an ethical dimension. Some poor answers had a narrow focus on either preserving pandas or elephants.

In these short essay questions answers are marked against 3 assessment objectives (AO). AO1 marks are awarded for relevant knowledge which the answer includes. AO2 marks are awarded where relevant knowledge is used to argue the case. For example, an answer may be awarded 1 mark for mentioning Darwin or evolution (AO1), but may be awarded further marks for using this information to argue that species are always being driven to extinction or that human interventions or actions have altered this natural process (AO2). AO3 marks are for QWC.

SECTION C

Answer BOTH questions.

You should aim to spend no more than 40 minutes on this section.

- 29 Some animals such as giant pandas struggle to survive in the modern world and would probably die out without human intervention. A wildlife expert has suggested that the money spent on conserving the most endangered species would be better spent on less vulnerable species, such as elephants, which are more likely to survive.

To what extent can this suggestion be justified?

This suggestion can be justified because it would make sense to protect a population of animals which are more likely to survive, rather waste money on a species who are ~~near~~ almost extinct.

However, who are we to make this choice after driving these animals to the brink of extinction. Most modern species of animals have become endangered because humans have destroyed their food, ^{and} habitats and many species such as elephants and tigers are hunted for ~~their~~ ~~big~~ trophies.

Destruction of habitats for many species of elephant is what makes these animals vulnerable for extinction. Pandas on the other hand have had their habitats in China reduced - or separated by busy roads, so pandas cannot cross to new territories to find mates. Their main source of food is also disappearing fast. So if both of these species were driven to extinction by humans, why will only certain species be given help to survive, whilst others are left to die out?

This opinion can be justified, because we do concentrate on protecting only the species at the edge of extinction, then there could be dangerous consequences for other species which may suddenly die out due to disease, which may also cause the extinction of the endangered species humans were already trying to protect.

So although it seems logical to protect species who are more likely to survive, is it moral since ~~that~~ we are the cause of endangerment for the more vulnerable ones?



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Examiner Comments

This answer was awarded 4 marks for content (AO1), 6 marks for using this content to argue their case (AO2) and 3 marks for QWC.

Question 30

Most candidates were able to attempt an answer to this question. Some candidates who did not receive high marks presented a picture of scientific research as an extension of school science, carried out by isolated individuals who should "pay for it themselves if they want to do it". Many answers considered the question in the context of the British economy, and argued that resources were more urgently needed elsewhere. Very few answers mentioned the technological spin-offs which scientific research has produced over several hundred years in Britain. On the whole, arguments about research funded by charities or businesses were better informed than those relating to government- funded research

In these short essay questions answers are marked against 3 assessment objectives (AO). AO1 marks are awarded for relevant knowledge which the answer includes. AO2 marks are awarded where relevant knowledge is used to argue the case. For example, marks for AO1 were awarded where answers mentioned that government funding came from taxpayers. Further marks were awarded for arguing that therefore taxpayers should have some say in what sort of research was funded. AO3 marks are for QWC.

30 Many new technological applications are produced by profit-making private companies, who also fund much of the relevant scientific research. Charities and some individuals provide funding in other areas. The government is the other major contributor to research funding in science.

What are the arguments for and against government funding of scientific research?

The government is one of the main contributors to scientific research.

But is it fair that they spend the tax payers money in this field?

On one hand the investing of the government can prove crucial in scientific research. Indeed examples such as the USA investment in penicillin and the French investment in Louis Pasteur that led to pasteurisation were vital in the construction of these revolutionary breakthroughs. Another example of why this is crucial is that it has the longterm impact of helping the economy with the new breakthroughs being brought and positively impacting the medical market. An example is in the USA with the Swineflu vaccine that was vastly sold to a variety of people. This can prove a vital feature of any country which has a lack of medicinal exports. For example in the

UK what we lose in terms of an export like oil ~~like~~ in for instance a country like Libya we make up in scientific breakthroughs and discoveries, such as Stephen Hawking's breakthroughs in black hole theories.

On the other hand it has its disadvantages. The tax payers money is what is paid to fund research - in a democratic country such as the UK parties should prioritise on promises of their manifestos before investing in research that likely has no immediate effect. This factor is further enhanced by the fact that we are in a recession - we should be focussing on solving the unemployment issue amongst others. For example - instead of capping the student university fees to ~~an~~ a huge figure of £9000 why can't the conservatives invest the money from scientific research into a field like this to prevent it?

To further aggravate this issue - the profit making companies are the ones who benefit from the demand of a really

researched product. And while this may have the long term impact of improving our economy it cannot be forgotten that its the tax payers money! This is further aggravated when governments invest into private research such as the USA government investing in MK Ultra into mind control which not only came to nothing but wasn't published to the tax payer.

In conclusion while the investment of the tax payers money into a field such as Scientific Research is ~~not~~ questionable - it is good in the sense that it improves the

(Total for Question 30 = 20 marks)

includes 4 marks for Quality of Written Communication

economies of countries such as England who cannot rely wholly on other material exports,

TOTAL FOR SECTION C = 40 MARKS

TOTAL FOR PAPER = 90 MARKS



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This answer was awarded 3 marks for AO1, 7 marks for AO2 and 3 marks for QWC.

Paper Summary

Candidates should be advised to

- 1 Answer all questions, paying particular attention to the marks awarded and recommended timing for each section.
- 2 If a question demands a calculation marks will not be awarded just for comments or descriptions.
- 3 Make sure you are answering the question set and do not include irrelevant material.
- 4 Questions about "strength of evidence" can be best answered by identifying facts and opinions in the source material.
- 5 In short essay questions think about what relevant facts you know and then think about how you can use these facts to make an argument for or against a particular point of view.

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