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GCSE Chemistry / Science 5CH1H/01 (Higher Tier) Support Materials

Top 10 Tips from the Principal Examiner for C1 and exemplar materials for the six-marker questions from the November 2011 session

Contents

Top 10 Tips from the Principal Examiner for Chemistry 5CH1H (Higher Tier)

1. **Attempt all questions** as even very limited answers may gain important marks.

2. Avoid using **generalisations without explanation**, e.g. rather than simply saying that something is environmentally friendly explain *why* it is environmentally friendly.

3. Make sure that you use the **correct scientific terms**, e.g. don't use molecule when the correct term is atom, and make sure that you fully understand the terms.

4. Don't use chemical formulae as short hand for the **names of substances**. Don't attempt to write balanced symbol equations when asked for **word equations**.

5. Learn how to write and balance **chemical equations**. When writing these equations make sure that you write chemical formulae clearly and correctly e.g. CO_2 not CO^2, and H_2O not H_{20}. Remember the rule that **gaseous elements apart from the noble gases are diatomic**, e.g. H_2, O_2, Cl_2.

6. **Show working in all calculations**, then you may score some marks even if your final answer is incorrect.

7. When asked about a **chemical test** the name of the reagent and the result of the test should always be stated.

8. When discussing **safety precautions** always ensure that the answer is specific to the hazard.

9. Plan your answers to **extended writing questions** to ensure that a well-structured answer that fully answers all parts of the question is produced.

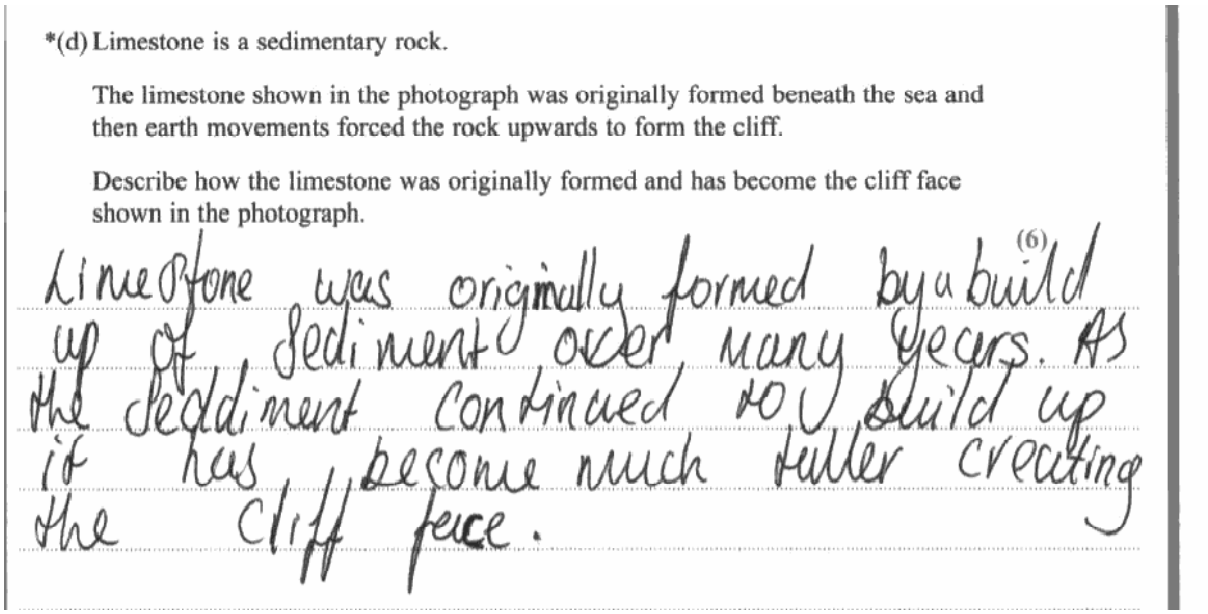
10. Make sure that any **corrections made to answers** are clear, preferably by crossing out the original and then writing the new answer.

Exemplar Materials for Question 5(d)

Sample A

1 mark

This response has a limited description including a mention of sediment and some idea about the time scale. There was no mention of the sea, and the final statement seems to suggest that the cliff was formed by sediment continuing to build up in some way.



*(d) Limestone is a sedimentary rock.

The limestone shown in the photograph was originally formed beneath the sea and then earth movements forced the rock upwards to form the cliff.

Describe how the limestone was originally formed and has become the cliff face shown in the photograph.

(6)

Limestone was originally formed by a build up of sediment over many years. As the seddiment continued to build up it has become much taller creating the cliff face.

Sample B

5 marks

This fairly detailed description of the rock formation is followed by the formation of the cliff and weathering. The quality of punctuation and grammar is poor.

*(d) Limestone is a sedimentary rock.

The limestone shown in the photograph was originally formed beneath the sea and then earth movements forced the rock upwards to form the cliff.

Describe how the limestone was originally formed and has become the cliff face shown in the photograph.

(6)

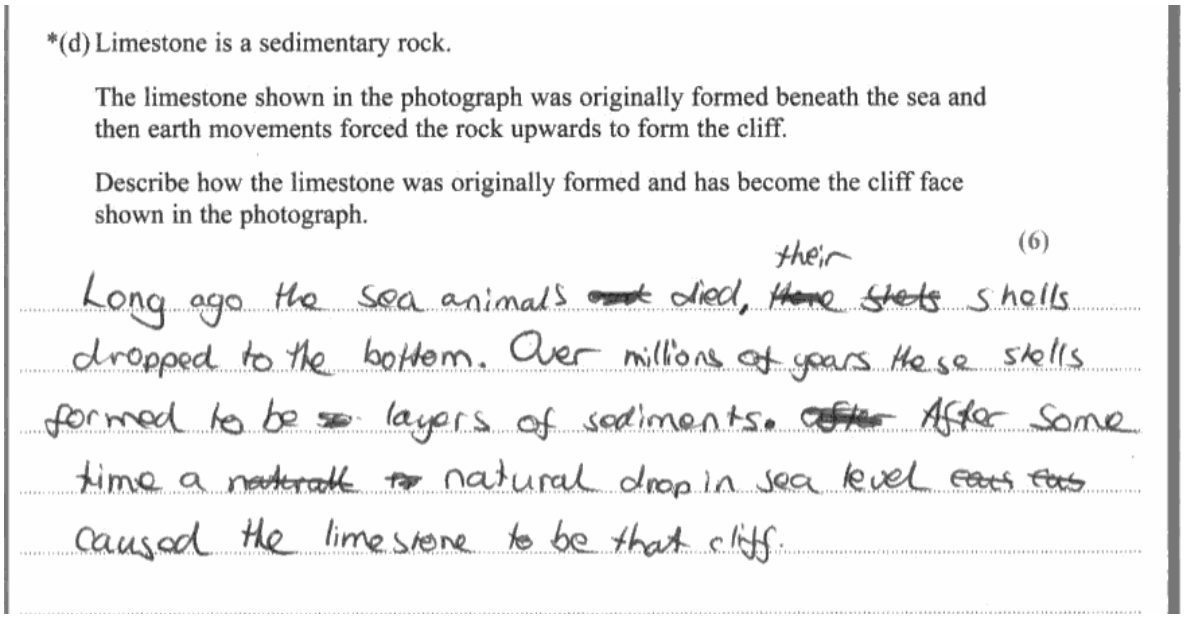
limestone is a sedimentary rock, it's therefore made by the laying of sediments in lakes and seas. Sediment get deposited at the bottom of seas and washed away by rain from soil this is called erosion more layers of sediments form, buring the layers underneath ~~them under pressure the buried layers~~ the pressure ~~weight~~ of the upper layers on the lower layer squeezes out the liquid, then a natural mineral called cement is deposited from the pores, the earth's movement forced the rock upwards to form the cliff and as the years pass limestone gets slowly worn away by the action of wind, water and friction this is called weathering the weathering of limestone is also caused by erosion which is the when water takes ~~the~~ sediments and minerals away

(Total for Question 5 = 12 marks)

Sample C

3 marks

This is slightly better than a limited description. Sea animals are mentioned but it is not made clear that 'the bottom' is the bottom of the sea. There was some idea of cliff formation.



*(d) Limestone is a sedimentary rock.

The limestone shown in the photograph was originally formed beneath the sea and then earth movements forced the rock upwards to form the cliff.

Describe how the limestone was originally formed and has become the cliff face shown in the photograph.

(6)

Long ago the sea animals ~~were~~ died, ~~there~~ their ~~shells~~ shells dropped to the bottom. Over millions of years these shells formed to be ~~so~~ layers of sediments. ~~After~~ After some time a ~~natural~~ natural drop in sea level ~~that~~ has caused the limestone to be that cliff.

Sample D

6 marks

This is a well written, detailed description that included many of the points from the indicative content.

*(d) Limestone is a sedimentary rock.

The limestone shown in the photograph was originally formed beneath the sea and then earth movements forced the rock upwards to form the cliff.

Describe how the limestone was originally formed and has become the cliff face shown in the photograph.

(6)

Limestone is a sedimentary rock. This means that it was formed by layers of the remains of dead sea creatures. These layers built up over millions of years, pressurising the layers below. This squeezed out any water in the sediment and was replaced with minerals. This compact layer is now the sedimentary rock, in this case limestone. The Earths movements beneath the crust caused the rock to move upwards, above the sea level. The cliff face now with direct contact with the wind suffered with erosion, giving it's appearance we see today.

Sample E

6 marks

This answer is a well written, detailed description containing many of the points from the indicative content and other correct statements. It is a good example of an answer worthy of full marks.

*(d) Limestone is a sedimentary rock.

The limestone shown in the photograph was originally formed beneath the sea and then earth movements forced the rock upwards to form the cliff.

Describe how the limestone was originally formed and has become the cliff face shown in the photograph.

(6)

Years ago, ~~micro-orgs~~ marine organisms used carbon dioxide from the atmosphere to make shells of calcium carbonate, when these animals died their shells fell to the bottom of the sea and became sediment. These layers of sediment gradually built on top of each other and they were compacted and squashed trapping several organisms and eventually became sedimentary rock ~~Due to t~~

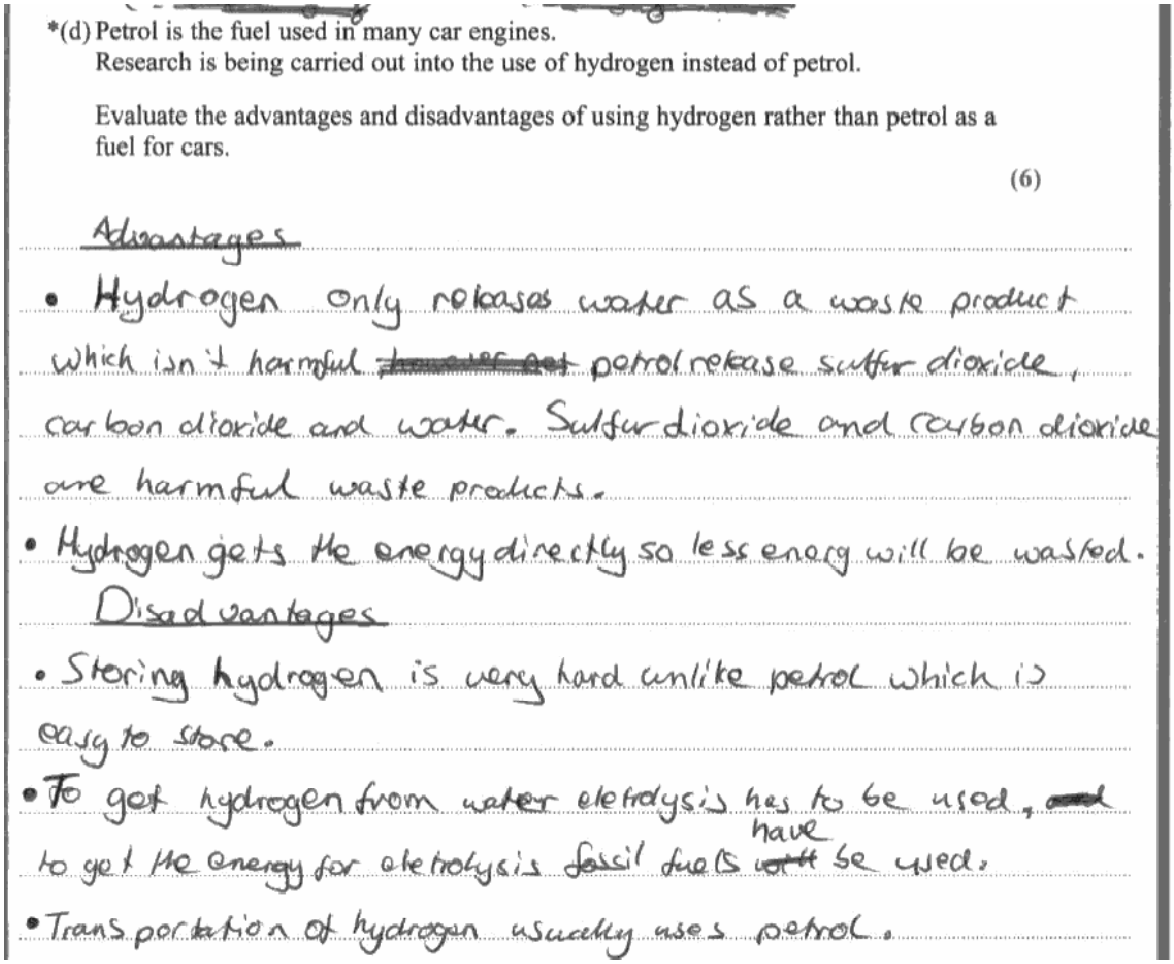
Due to the Earth movements, it forced the rock to move upwards to form the cliff. ~~Limes~~ sedimentary rocks are more ~~prone~~ prone to erosion and weathering because they are weakly joined together with small gaps between them. The cliff had weathered away and has become the ~~diff f~~ cliff face shown in the photograph.

Exemplar Materials for Question 6(d)

Sample A

5 marks

There is a fairly detailed description but lacking sufficient detail for full marks.



*(d) Petrol is the fuel used in many car engines.
Research is being carried out into the use of hydrogen instead of petrol.

Evaluate the advantages and disadvantages of using hydrogen rather than petrol as a fuel for cars.

(6)

Advantages

- Hydrogen only releases water as a waste product which isn't harmful ~~however not~~ petrol release sulfur dioxide, carbon dioxide and water. Sulfur dioxide and carbon dioxide are harmful waste products.
- Hydrogen gets the energy directly so less energy will be wasted.

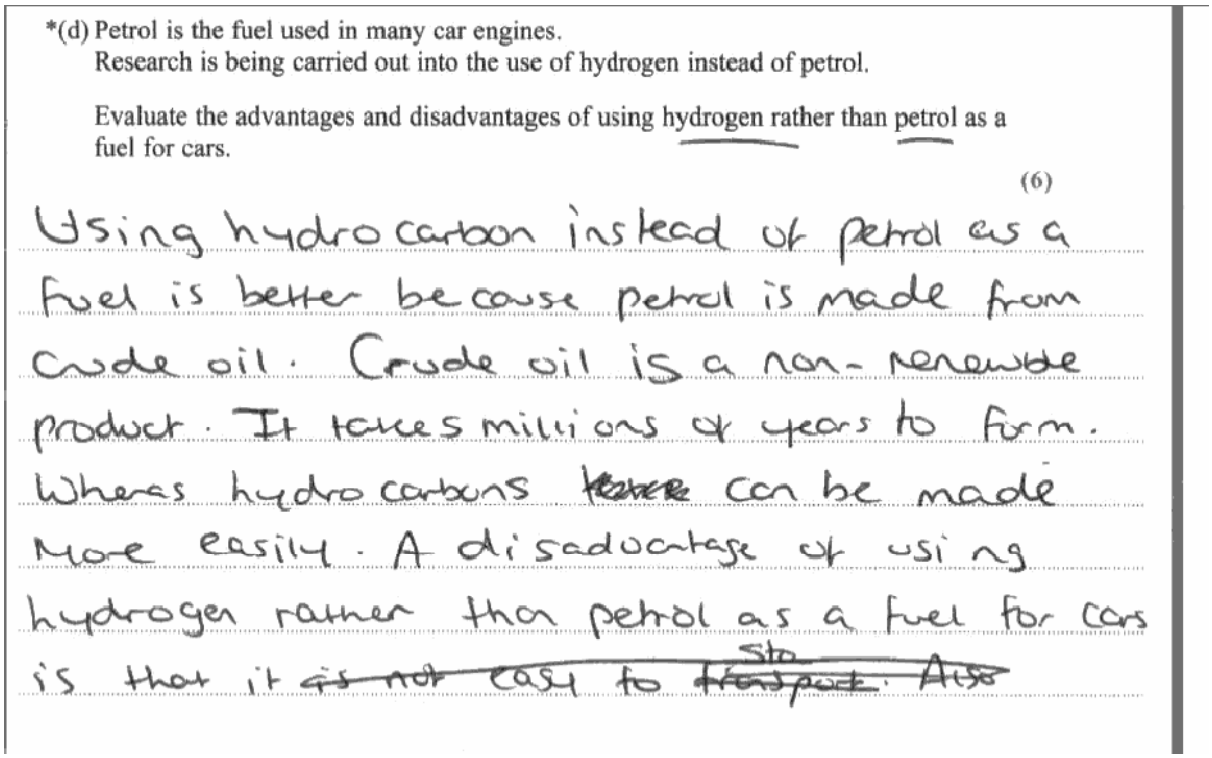
Disadvantages

- Storing hydrogen is very hard unlike petrol which is easy to store.
- To get hydrogen from water electrolysis has to be used, ~~and~~ to get the energy for electrolysis fossil fuels ~~will~~ have to be used.
- Transportation of hydrogen usually uses petrol.

Sample B

1 mark

This answer shows confusion between hydrogen and hydrocarbons. It does, however, make a limited number of correct points.



*(d) Petrol is the fuel used in many car engines.
Research is being carried out into the use of hydrogen instead of petrol.

Evaluate the advantages and disadvantages of using hydrogen rather than petrol as a fuel for cars.

(6)

Using hydro carbon instead of petrol as a fuel is better because petrol is made from crude oil. Crude oil is a non-renewble product. It takes millions of years to form. Whereas hydro carbons ~~where~~ can be made more easily. A disadvantage of using hydrogen rather than petrol as a fuel for cars is that it ~~is not easy to transport. Also~~ Sto

Sample C

3 marks

This answer makes several valid points but shows possible confusion with biofuels when stating that hydrogen takes up land. The quality of punctuation and grammar is poor.

(d) Petrol is the fuel used in many car engines.
Research is being carried out into the use of hydrogen instead of petrol.

Evaluate the advantages and disadvantages of using hydrogen rather than petrol as a fuel for cars.

(6)

hydrogen is a renewable source were as petrol is non-renewable, petrol is sold at most gas stations were as hydrogen isnt, petrol creates alot of carbon dioxide because of the buring of a fossil fuel were as hydrogen creates little due to transport, hydrogen takes up land and is not very exported to many countries as petrol is highly used and cheaper.

Sample D

6 marks

A well written detailed description, this answer contains many of the points from the indicative content. The problem of producing electricity for electrolysis is not discussed but there is sufficient detail for the award of full marks.

*(d) Petrol is the fuel used in many car engines.
Research is being carried out into the use of hydrogen instead of petrol.

Evaluate the advantages and disadvantages of using hydrogen rather than petrol as a fuel for cars.

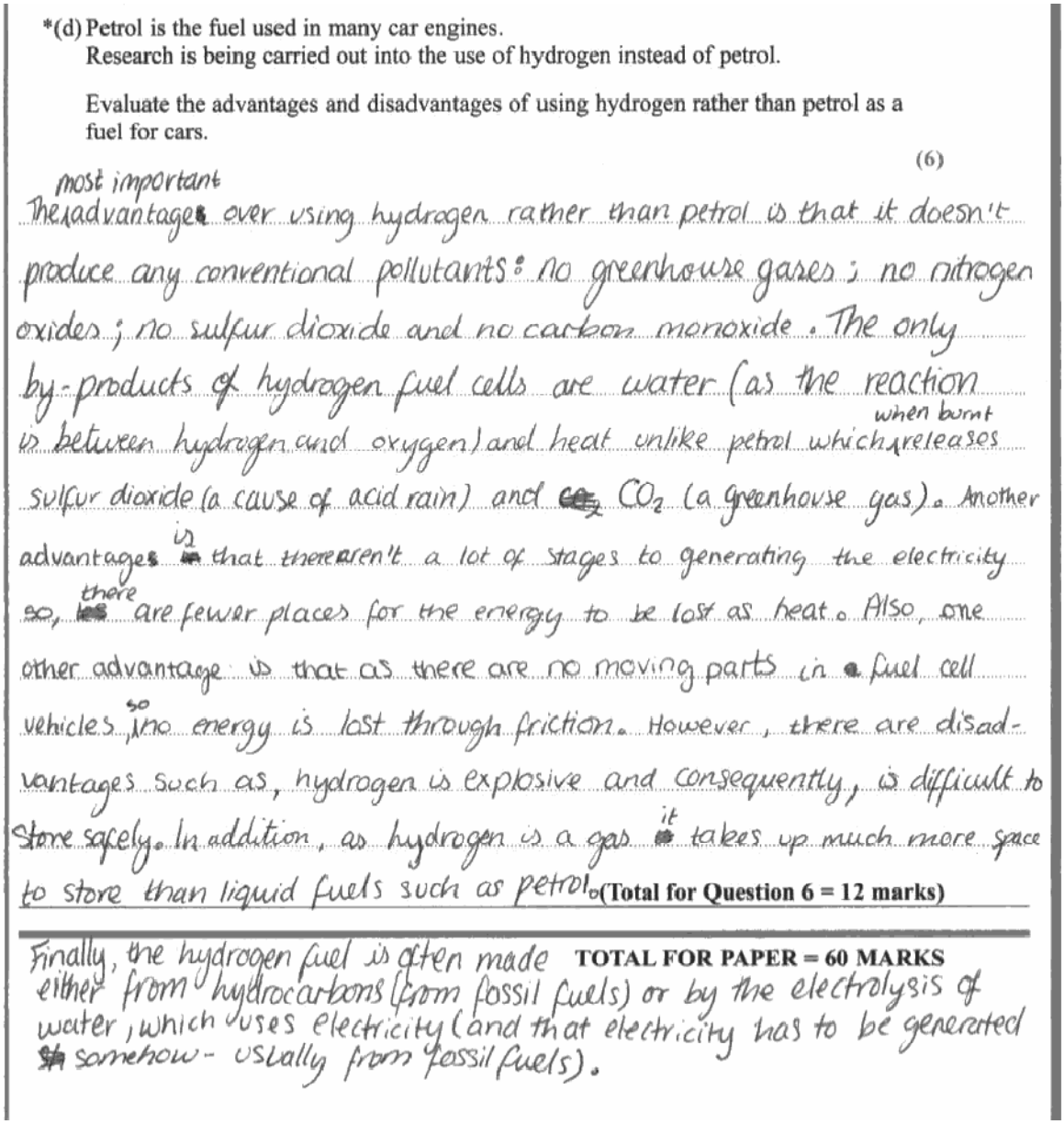
(6)

Using hydrogen is less environmentally damaging than petrol as petrol, when burned, produces the greenhouse gas carbon dioxide which is increasing the effects of global warming. ~~Whereas~~ Whereas hydrogen gas only produces water. Also, hydrogen is renewable as it can easily be obtained through the use of electrolysis of water, but petrol is a fossil fuel : its resources are finite and non-renewable as it takes millions of years to form fossil fuels. However, hydrogen is extremely flammable and as a result is very hard to store. Petrol, on the other hand, can easily be stored in a tank. Another problem about the use of hydrogen is that it is very expensive developing the technology. As a whole, hydrogen is a better fuel for cars as it will reduce the long term damage caused by global warming.

Sample E

6 marks

This is a well written detailed description containing many of the points from the indicative content and other correct statements. It is a good example of an answer worthy of full marks.



*(d) Petrol is the fuel used in many car engines.
Research is being carried out into the use of hydrogen instead of petrol.

Evaluate the advantages and disadvantages of using hydrogen rather than petrol as a fuel for cars.

(6)

The most important advantages over using hydrogen rather than petrol is that it doesn't produce any conventional pollutants: no greenhouse gases; no nitrogen oxides; no sulfur dioxide and no carbon monoxide. The only by-products of hydrogen fuel cells are water (as the reaction is between hydrogen and oxygen) and heat unlike petrol which, when burnt releases sulfur dioxide (a cause of acid rain) and CO_2 (a greenhouse gas). Another advantages is that there aren't a lot of stages to generating the electricity so, there are fewer places for the energy to be lost as heat. Also, one other advantage is that as there are no moving parts in a fuel cell vehicles, so no energy is lost through friction. However, there are disadvantages such as, hydrogen is explosive and consequently, is difficult to store safely. In addition, as hydrogen is a gas it takes up much more space to store than liquid fuels such as petrol. **(Total for Question 6 = 12 marks)**

Finally, the hydrogen fuel is often made either from hydrocarbons (from fossil fuels) or by the electrolysis of water, which uses electricity (and that electricity has to be generated somehow - usually from fossil fuels).

TOTAL FOR PAPER = 60 MARKS