

**Task 7: Fossil Fuels versus Biofuels Extended Response**

**Question/Answer Booklet**

**CHEMISTRY UNIT 1**

Student Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Teacher’s Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# TIME ALLOWED FOR THIS PAPER

Working time for the paper: 50 minutes

# MATERIALS REQUIRED/RECOMMENDED FOR THIS PAPER

**To be provided by the supervisor:**

This Question/Answer Booklet

Chemistry Data Book

**To be provided by the candidate:**

Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, eraser, correction tape/fluid, ruler, highlighters

Special items: up to three non-programmable calculators approved for use in the WACE examinations, one A4 page of notes (double sided)

# IMPORTANT NOTE TO CANDIDATES

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further

**For this task, you are required to discuss fossil fuels and biofuels by answering the prompt at the start of the paper. You will do this in the form of an extended report, and this in report you should include:**

1. **Define what a fuel, fossil fuel, and biofuel are. Various examples of fuels and biofuels should be provided**
2. **An in-depth analysis of one fuel and an analogous biofuel, including how each is manufactured and/or refined**
3. **The amount of energy and carbon dioxide produced by the fuel and biofuel**

**You should write your response on the following pages. If you need more paper, simply raise your hand and ask the supervisor for an extra page.**

**“Biofuels are a passing fad with no foreseeable economic, environmental, or industrial benefits or applications.”**

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| What are biofuels and fossil fuels?  /4 | 4 | 3 | 2 | 1 |
| Student definitions of biofuels and fossil fuels are accurate, detailed, and descriptive. | Student definitions of biofuels and fossil fuels are accurate and descriptive but missing some detail. | Student definitions of biofuels and fossil fuels are general in nature. | Student definitions of biofuels and fossil fuels are vague and limited. |
| Examples of biofuels and fossil fuels  /4 | Student provides varied examples of both fossil fuels and biofuels, including their molecular structure. The fuel examples are clearly and correctly identified as either bio or fossil fuel. | Student provides varied examples of both fossil fuels and biofuels, but does not include their molecular structure. The fuel examples are clearly and correctly identified as either bio or fossil fuel. | Student provides some examples of both fossil fuels and biofuels, but does not including their molecular structure. The fuel examples are not clearly identified as either bio or fossil fuel. | Student provides some examples of both fossil fuels and biofuels, but does not including their molecular structure. The fuel examples are not clearly identified as either bio or fossil fuel. |
| Manufacturing and Refinement process  /4 | Student includes an accurate, detailed, and descriptive explanation of the manufacturing/refinement process for a bio and fossil fuel. | Student includes an accurate and descriptive explanation of the manufacturing/refinement process for a bio and fossil fuel that is missing some detail. | Student includes a general explanation of the manufacturing/refinement process for a bio and fossil fuel that is missing some detail. | Student includes only a limited explanation of the manufacturing/refinement process for a bio and fossil fuel. |
| Thermochemical equations  /4 | Student includes a complete and balanced thermochemical reaction of one bio and one fossil fuel. | Student includes a complete and balanced thermochemical reaction of one fuel, but not its analogous bio or fossil fuel. | Student includes a chemical reaction of one fuel but it is either not balanced or does not include energy output. | Student includes a chemical reaction of one fuel but it is not balanced and does not include energy output. |
| Compare energy output  /4 | Student includes a comparison of energy output per gram of fuel between fossil and biofuels.  The comparison uses % composition of the main hydrocarbon in the fuel to determine the moles and therefore the energy output. | Student includes a comparison of energy output per gram of fuel between fossil and biofuels.  The comparison uses % composition of the main hydrocarbon in the fuel to determine the energy output. | Student includes a comparison of energy output per mole of fuel between fossil and biofuels.  The comparison uses % composition of the main hydrocarbon in the fuel to determine the energy output. | The student includes a comparison of energy output for each fuel but does not make that comparison with any reference to % composition. |

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| Compare carbon dioxide produced  /4 | Student includes a comparison of CO2 produced per gram of fuel between fossil and biofuels.  The comparison uses % composition of the main hydrocarbon in the fuel to determine the moles and therefore the CO2 production. | Student includes a comparison of CO2 produced per gram of fuel between fossil and biofuels.  The comparison uses %composition of the main hydrocarbon in the fuel to determine the CO2 production. | Student includes a comparison of CO2 produced per mole of fuel between fossil and biofuels.  The comparison uses % composition of the main hydrocarbon in the fuel to determine the CO2 production. | The student includes a comparison of CO2 produced for each fuel but does not make that comparison with any reference to % composition hydrocarbon or per gram basis. |
| Viability of fossil fuels versus biofuels  /4 | Student identifies various advantages and disadvantages to both fossil fuels and biofuels in order to arrive at an appropriate response to the supplied prompt | Student identifies at least one advantage and disadvantage to both fossil fuels and biofuels in order to arrive at an appropriate response to the supplied prompt | Student uses an advantage or disadvantage of fossil fuels and biofuels in order to arrive at an appropriate response to the supplied prompt | Student responds to the supplied prompt with little reference to evidence |
| Response  /3 |  | Student responds to the prompt in great detail, regularly reminding the reader of the purpose of their response | Students responses reference the prompt, however the majority of the response is vague in reference to it | Student makes no reference to the prompt |