Homework sheet

Name Class Date

**1** This question is about crude oil.

Complete the paragraph with the correct words. Use each word only once.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| boiling | column | condense | cooler | distillation | fossil | |  |
| fractional | fractions | gases | high | low | lower | separated | |

Crude oil is a type of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ fuel. It is not very useful on its own, but it can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into the different compounds that make it up using a process called fractional \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

As the different substances that make up crude oil have different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ points a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ distillation column can be used. Fractions that have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ boiling points will remain as liquids \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ down the column. Fractions with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ boiling points will remain as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ until they are high up in the column where it is much \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Here the gases will cool down and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into liquids. The different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of crude oil can be removed from different parts of the fractionating \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

[Total for Question 1  13 marks]

**2** The diagram shows a fractionating column.

**a** Label the fractions on the space provided on the diagram.

[3 marks]

**b** State a use for each fraction.

[6 marks]

|  |  |  |
| --- | --- | --- |
|  | **Fractions** | **Uses** |
|  |  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**c** State which fraction has the highest boiling point.

[1 mark]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**d** State which fraction has the smallest hydrocarbon molecules.

[1 mark]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**e** State which fraction is a liquid and ignites the easiest.

[1 mark]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**f** State which fraction is the most viscous.

[1 mark]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[Total for Question 2  13 marks]

**3** This question is about acid rain.

**a** State the gas which dissolves in rainwater to form sulfurous acid.

[1 mark]

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**b** Write a balanced equation for the reaction between the gas in part (a) and water to form sulfurous acid.

[2 marks]

**c** Sulfurous acid produced reacts with oxygen in the air forming sulfuric acid. Write a balanced equation for this reaction.

[3 marks]

**d** Acid rain is an environmental pollutant. For each of the following situations, describe a problem acid rain can cause:

[4 marks]

**i** stonework on buildings or marble statues

**ii** plants on land

**iii** metals used in building structures

**iv** living organisms in rivers or lakes

[Total for Question 3  10 marks]

[Total for Homework  36 marks]