**Crude oil and its components**

**(This sheet accompanies the video experiment)**

**Aim:** To investigate the fractionation of crude oil and the products produced.

**Background**

For around a century the world has been powered by the products obtained from crude oil. Petrol, diesel, plastics, pharmaceuticals, fabrics and pesticides are just a few examples of chemicals that are in high demand and have their origins in crude oil.

**Part A**: Crude oil

Crude oil is mainly a mixture of alkanes. The composition varies significantly with the history of the deposit.

1. Explain how crude oil deposits form and how the oil gets to a refinery.

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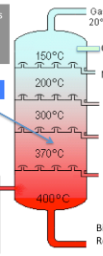
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2. Which of the following molecules might be components of crude oil?

C4H8 C5H12 octane butene

3. a. Draw pentane, heptane and nonane.



b. Write under your structures the boiling point of each.

c. Explain in detail why pentane and nonane are separated

in this column.

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**Part B**: Laboratory distillation

4. A sample of crude oil contains pentane, nonane and diesel.

It is at room temperature but is added to a flask in the lab where any gases produced can be

collected when they cool. Describe in detail what you will see happening as the sample is

heated.

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5. Is distillation a chemical reaction? Justify your answer.

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6. Describe how the appearance of pentane will differ from that of diesel.

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7. a. What is viscosity?

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b. How will the viscosity of nonane differ to that of pentane?

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c. Explain why the viscosity is different.

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8. a. What is flammability?

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b. How will the flammability of nonane differ from that of pentane?

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c. Write a balanced equation for the reaction of pentane in air to form CO2 and water.

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9. How does a service station prevent you from putting diesel in a car engine?

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10. Refineries often take some components formed in fractional distillation and convert them to

smaller alkanes in further processes. Why would they do this?

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