

Exercise walk-through

Fuels ■ 11.3

eXercise

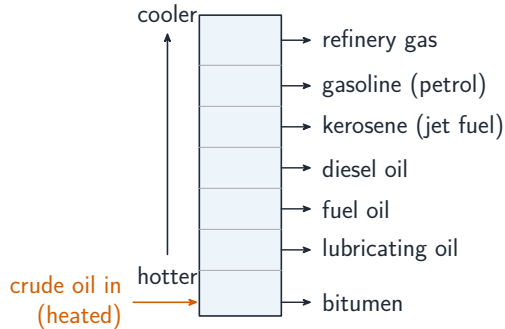
You must be able to

- name the fossil fuels and define a hydrocarbon
- describe fractional distillation and the trends up the column
- match fractions to their uses

Method — Fractional distillation

- going **up** the column: shorter chains, higher volatility, lower boiling point, lower viscosity.
- fractions: refinery gas, gasoline, naphtha, kerosene, diesel, fuel oil, bitumen.

Method — Fractional distillation



up the column: smaller molecules,
lower boiling points, more volatile

A fractionating column with fractions drawn off at different heights

Method — Fractional distillation

large alkane molecule



heat + catalyst



smaller alkanealkene (C=C)

Cracking turns long fractions into useful fuels

Practice 2.1 ■ 1 mark

Define a hydrocarbon.

Solution 2.1

Worked steps

a compound containing hydrogen and carbon only **B1**.

Practice 2.2 ■ 1 mark

Name the fraction used as fuel for cars.

Solution 2.2

Method: Fractional distillation

Worked steps

gasoline / petrol **B1**.

Exam-style 3.1 ■ 1 mark

Going up the fractionating column, the boiling point of the fractions:

- A** increases
- B** decreases
- C** stays the same
- D** increases then decreases

Solution 3.1

Method: Fractional distillation

A increases

B decreases 

C stays the same

D increases then decreases

Worked steps

B. Boiling point decreases up the column.

Exam-style 3.2 ■ 2 marks

Petroleum is separated by fractional distillation.

- (a) Explain why the different fractions separate.
- (b) State one use of bitumen.

Solution 3.2

Method: Fractional distillation

Worked steps

- (a) the fractions have different boiling points **M1**; they condense at different heights as the column cools towards the top **A1**.
- (b) making roads **B1**.

Exam-style 3.3 ■ 2 marks

Explain why a fraction near the top of the column flows more easily than one near the bottom.

Solution 3.3

Method: Fractional distillation

Worked steps

fractions near the top have smaller molecules / lower viscosity **M1**; so they flow more easily than the larger molecules near the bottom **A1**.