

GCSE Chemistry A (Gateway Science)

J248/02 C4-C6 and C7 Foundation (Foundation Tier)

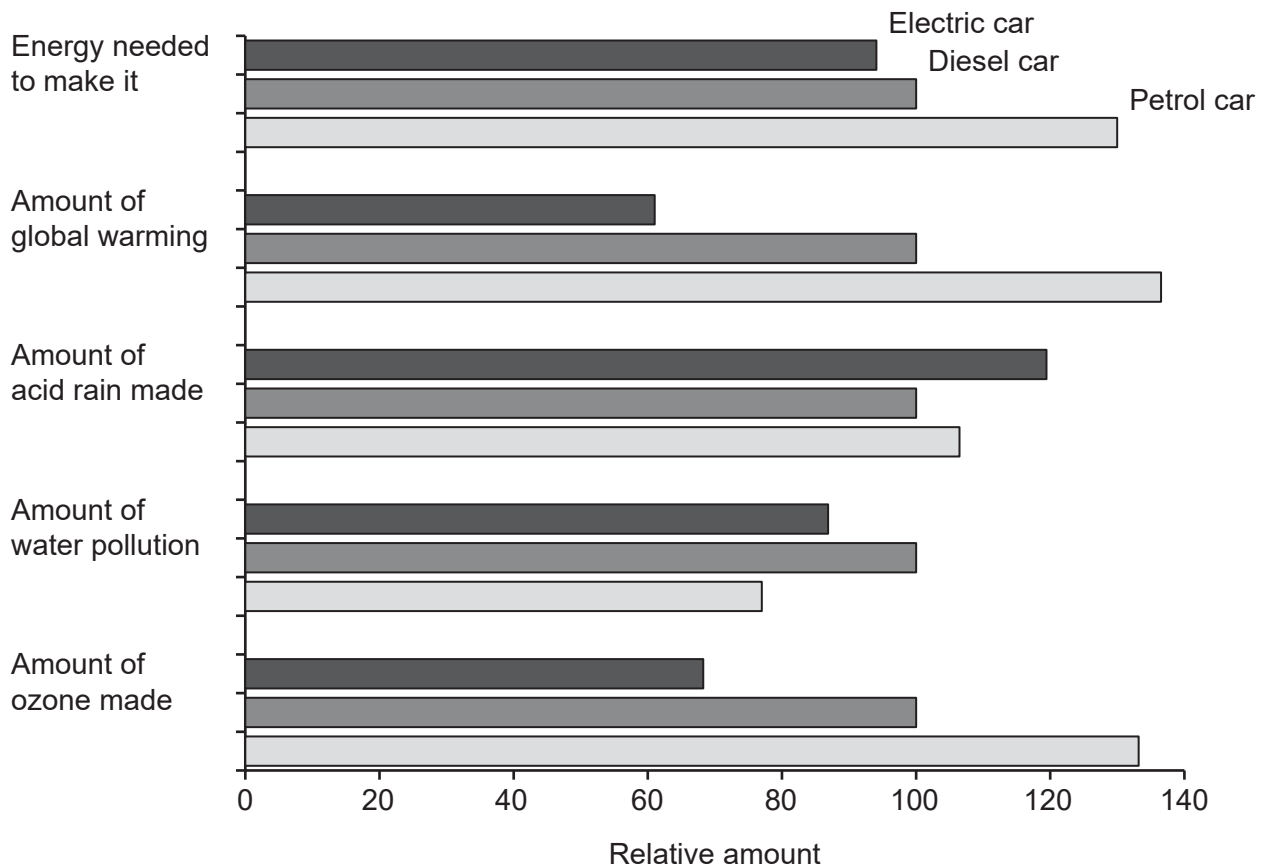
Question Set 21

1 This question is about life-cycle assessment.

- (a) A car company is developing three new cars:
- A petrol car
 - A diesel car
 - An electric car.

They do a life-cycle assessment of each car.

Look at the information about the life-cycle assessment of each car.



The company decides to manufacture and sell the electric car.

Explain why they make this choice.

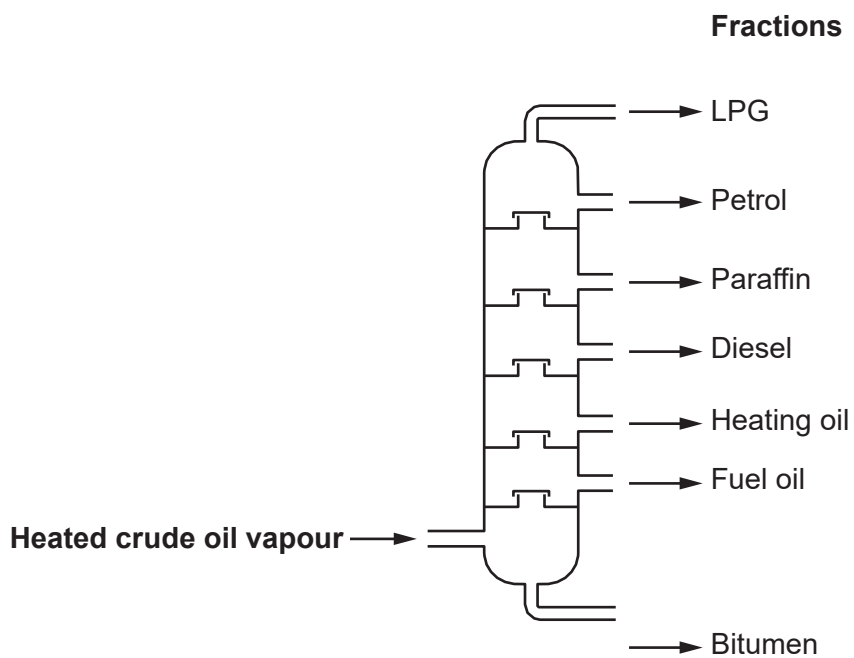
Use the information from the life-cycle assessment to help you.

[3]

(b) The fuels for the petrol and diesel cars are made from crude oil.

Crude oil is separated into different parts by **fractional distillation**.

The diagram shows a fractionating column.



Explain why crude oil **vapour** can be separated by fractional distillation.

[3]

(c) The table shows the boiling points of molecules present in different crude oil fractions.

Molecule	Boiling point (°C)
A	-2
B	125
C	216
D	502

Which molecule, **A**, **B**, **C** or **D**, is in the **LPG fraction**?

Explain your decision.

[2]

(d) Car manufacturers are developing cars that are powered by hydrogen/oxygen fuel cells.

The table shows some information about a 200 km journey using an electric car and a car using a fuel cell.

Feature	Electric	Fuel cell
Refuelling time (minutes)	360	4
Cost of refuelling (£)	3.20	4.20
CO ₂ emitted (kg)	48	36
Mass of car (kg)	1550	1200

Evaluate the **advantages** and **disadvantages** of using a car powered by a fuel cell, rather than an electric car for the 200 km journey.

[3]

Total Marks for Question Set 21: 11

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