

GCSE Chemistry B (Twenty First Century Science)

J258/04 Depth in chemistry (Higher Tier)

Question Set 6

1. The table shows the names and chemical formulae of some alkanes and alkenes.

Number of carbon atoms (n)	Alkanes		Alkenes	
	1	methane	CH ₄	
2	ethane	C ₂ H ₆	ethene	C ₂ H ₄
3	propane	C ₃ H ₈	propene	C ₃ H ₆
4	butane	C ₄ H ₁₀	butene	C ₄ H ₈

- (a) An alkene called 'methene' cannot exist.
Explain why. [2]
- (b) All the alkenes are members of the same homologous series. [1]
- (i) How do the formulae of the alkenes show that they are from the same homologous series? [1]
- (ii) How do the formulae of the alkanes and alkenes show that they are from different homologous series? [2]
- (c) The general formula for an alkane is C_nH_(2n+2). [1]
- Use this general formula to predict the chemical formula for an alkane which contains 50 carbon atoms.
- (d) The general formula for an alkene is C_nH_{2n}.
- A **general equation** for the complete combustion of alkenes uses the number of carbon atoms in the alkene to balance the equation.
- general equation** C_nH_{2n} + 1.5nO₂ → nCO₂ + nH₂O
- (i) Use the general equation to write a balanced equation for the combustion of butene, C₄H₈.
Explain your reasoning for each part of the equation. [3]
- (ii) This general equation can be used to balance equations for the complete combustion of alkenes, but does **not** work for alkanes.
- Give **one** reason why the equation does **not** work for alkanes. [1]

Total Marks for Question Set 6: 10

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