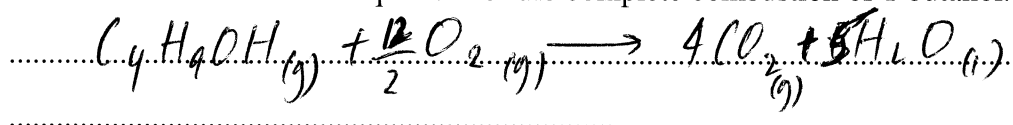


Question 23 (3 marks)

- (a) Write a balanced chemical equation for the complete combustion of 1-butanol.
- 1



- (b) A student measured the heat of combustion of three different fuels. The results are shown in the table.
- 2

Fuel	Heat of combustion (kJ g ⁻¹)
A	-48
B	-38
C	-28

$$\begin{aligned} \text{MM} &= 74.08 \\ \times 74.08 &= 3555.84 \text{ kJ} \\ \times 74.08 &= 2815.04 \\ \times 74.08 &= 2676 \end{aligned}$$

The published value for the heat of combustion of 1-butanol is 2676 kJ mol⁻¹.

Which fuel from the table is likely to be 1-butanol? Justify your answer.

fuel C is 1-butanol. $\Delta H = \frac{\text{kJ}}{\text{m}}$

$n = \frac{m}{\text{MM}}$ to change to kJ/mol.

$$\frac{\text{kJ}}{\text{m}} \times \text{MM} \quad \text{so} \quad -28 \times 74.08 = 2676 \text{ kJ/mol}$$

To change from kJ/g to kJ/mol
 find kJ/g by molar mass to get
 kJ/mol ΔH (heat of combustion).