Question 23 (3 marks)

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

$C_4H_9OH_{(g)} + \frac{12}{2}O_{2(g)} \longrightarrow 4CO_{2(g)} + 5H_2O_{(l)}$

(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

MM = 74.08.
× 74.08 = 3555.84 KJ
× 74.08 = 2815.04
× 74.08 = 2076

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. $\Delta H = \frac{KJ}{m}$.

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

$\frac{KJ}{m} \times MM$ ie $-28 \times 74.08 = 2076$ KJ/mol

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