Question 23 (3 marks)

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

$C_4H_9OH_{(l)} + 6O_{2(g)} \longrightarrow 4CO_{2(g)} + 5H_2O_{(l)}$

(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

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.

1-butanol = C_4H_9OH M(74.12)

$2676 \div 74.12 = 36.16...$

≈ 36

∴ fuel B is most likely to be 1-butanol