Question 23 (3 marks)

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

$CH_3CH_2CH_2CH_2OH \rightarrow 4CO_2 + 5H_2O$

(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

molar mass $= (12.01 \times 4) + (16) + (1.008 \times 10) = 74.12$

$n = \frac{m}{M}$

$x = \frac{48}{74.12}$

$= 0.64...$

0.51

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. fuel C has a total of 0.37765755 J/mol, henceforth, having the closest number to the published value of 2676 kJ/mol. Compared to the other values of

A = 0.64

B = 0.51... when both are in joules