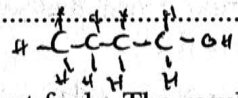
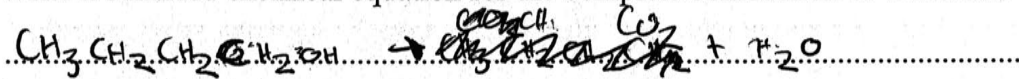


**Question 23** (3 marks)

- (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 <sup>-1</sup> )
A	-48
B	-38
C	-28

$n = \frac{m}{M}$   
 $x = \frac{48}{74.12}$   
 $= 0.64$

molar mass  
 $= (2.01 \times 4) + (16) + (1.008 \times 10)$   
 $= 74.12$

The published value for the heat of combustion of 1-butanol is 2676 kJ mol<sup>-1</sup>.

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 where both are in joules