(ii) When the fuel burns, the 600 g of sulfur produces sulfur dioxide gas.

$$S + O_2 \rightarrow SO_2$$

Calculate the volume, in cm^3, of sulfur dioxide gas that would be produced at room temperature and pressure (rtp) when the fuel burns.

[for a gas, molar volume = 24 dm^3 at rtp]

(3)

$S + O_2 \rightarrow SO_2$

1mol 1mol 1mol

balanced chemical equation

1 mol gas $\rightarrow$ 24 dm^3 at rtp

Moles = $\frac{\text{mass of S}}{\text{Mr of S}}$

$$\text{mol} = \frac{600\,g}{32\,g/mol} = 18.75\ mol$$

Mole Ratio

S : SO_2

1 mol : 1 mol

18.75 mol : x

x = 18.75 mol of SO_2

1 mol = 24 dm^3

18.75 mol = x

$\Rightarrow x = 24 \times 18.75$

$x = 450\ dm^3$ of SO_2