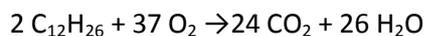


**Question:**

The chemical formula of petrol is  $C_{12}H_{26}$ . If we want to burn completely 1 liter in air, find out mass of oxygen, moles of oxygen, volume of oxygen.

**Answer:**

The equation of reaction:



According to this equation, to burn 2 liters of hydrocarbon  $C_{12}H_{26}$ , 37 liters of oxygen  $O_2$  are required. If we have 1 liter of hydrocarbon  $C_{12}H_{26}$ , then  $V(O_2) = 37/2 = 18.5$  liters of oxygen  $O_2$  are necessary.

The amount of moles of  $O_2$  can be estimated:

$$n(O_2) = \frac{V(O_2)}{V_m}, \text{ where } V_m = 22.4 \text{ L/mol is the volume of one mole of gaseous compound at STP.}$$

**Therefore, the amount of moles of oxygen  $O_2$ :**

$$n(O_2) = \frac{V(O_2)}{V_m} = \frac{18.5L}{22.4L/mol} = 0.826mol$$

**The mass of oxygen  $O_2$  is defined as:**

$$m(O_2) = n(O_2) \times M(O_2) = 0.826mol \times 31.999g/mol = 26.4g, \text{ where } M(O_2) \text{ is the mass of one mole of oxygen } O_2.$$