TOPIC
Chemistry – Section III – Question 1

QUESTION
The molecular weight of a particular hydrocarbon is 72 gr/mol and it is 83.3% (by weight) carbon and 16.7% by weight hydrogen. Its chemical formula is

(A) C_5H
(B) C_5H_{12}
(C) C_7H_{17}
(D) CH_5O

HINT
Choose one mole of hydrocarbon as a basis.

SOLUTION
Basis: 1 mol of hydrocarbon = 72 gr

Mass of carbon = $0.833 \times 72 = 60.0\text{gr}$
Moles of carbon = $\frac{60.0\text{gr}}{12\text{gr/mol}} = 5\text{mols}$
Mass of hydrogen = $0.167 \times 72 = 12\text{gr}$
Moles of hydrogen = $\frac{12\text{gr}}{1\text{gr/mol}} = 12\text{mols}$

If one mole of hydrocarbon has 5 mols of C and 12 moles of H, then one molecule of hydrocarbon has 5 atoms of C and 12 atoms of H. The formula is C_5H_{12}.

ANSWER
(B)

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