TOPIC
Chemistry – Section III – Question 6

QUESTION
How many moles of air would you need to completely oxidize 1 mol of octane (C_8H_{18}) into CO_2 and H_2O? Air is approximately 21 mol % O_2 and 79 mol % N_2.

(A) 2.6
(B) 3.3
(C) 12.5
(D) 59.5

HINT
Write a balanced chemical reaction for the oxidation.

SOLUTION
The balanced chemical reaction is

$$C_8H_{18} + 12.5O_2 = 8CO_2 + 9H_2O$$

Thus one mole of octane requires

$$12.5 \text{ moles of } O_2 = \frac{12.5}{0.21}$$

$$= 59.5 \text{ moles of air.}$$

ANSWER
(D)

CONTRIBUTOR
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