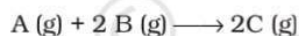


LECTURE 10

RELATED PROBLEMS

Q1

17. Compounds 'A' and 'B' react according to the following chemical equation.



Concentration of either 'A' or 'B' were changed keeping the concentrations of one of the reactants constant and rates were measured as a function of initial concentration. Following results were obtained. Choose the correct option for the rate equations for this reaction.

Experiment	Initial concentration of [A]/mol L ⁻¹	Initial concentration of [B]/mol L ⁻¹	Initial rate of formation of [C]/mol L ⁻¹ s ⁻¹
1.	0.30	0.30	0.10
2.	0.30	0.60	0.40
3.	0.60	0.30	0.20

- (i) Rate = $k [\text{A}]^2 [\text{B}]$
- (ii) Rate = $k [\text{A}] [\text{B}]^2$
- (iii) Rate = $k [\text{A}] [\text{B}]$
- (iv) Rate = $k [\text{A}]^2 [\text{B}]^0$

Ans. (ii)

Explanation: Rate of experiment = $k[\text{A}]^x[\text{B}]^y = k[0.30]^x[0.30]^y$

Rate of experiment = $k[0.30]^x[0.60]^y$

Dividing experiment (1) by (2)

$$\frac{k[0.30]^x[0.30]^y}{k[0.30]^x[0.60]^y} = \frac{0.10}{0.40}$$

$$[1/2]^y = 1/4 \text{ or } y = 2$$

Similarly, on dividing rate of experiment (1) by (3)

$$\frac{k[0.30]^x[0.30]^y}{k[0.60]^x[0.30]^y} = \frac{0.10}{0.20}$$

$$[1/2]^x = 1/2 \text{ or } x = 1$$