SECTION-A

Answer all the questions by selecting the most suitable alternative (1M × 5 = 5M)

(1) Which of the following expression is correct for the rate of reaction of following reaction?

$$NO + O_2 \longrightarrow 2NO_2$$

(A) $\text{Rate} = +\frac{\Delta[NO]}{\Delta t}$ (B) $\text{Rate} = -\frac{\Delta[NO_2]}{\Delta t}$ (C) $\text{Rate} = -\frac{1}{2}\frac{\Delta[NO]}{\Delta t}$ (D) $\text{Rate} = +\frac{\Delta[O_2]}{\Delta t}$

(2) If the rate of the reaction is expressed as $R = [A]^{1/2}[B]^{3/2}$ then total order is

(a) 1 (b) 2 (c) 3 (d) 4

(3) For the 41^{th} order reaction, what is the unit of the rate constant?

(A) $Mol^{-40}\ lit^{40}\ time^{-1}$ (B) $Mol^{40}\ lit^{-40}\ time^{-1}$ (C) $Mol^{-40}\ lit^{-40}\ time^{-1}$
(D) $Mol^{-40}\ lit^{-40}\ time^{-40}$

(4) Concentration of sulphide ore is done by which process?

(A) Rosting (B) Calcination (C) Electrolysis (D) Froth flotation

(5) Aluminum Metal can be extracted by which of the process?

(A) Hall-Heroult Process (B) Vapour phase refining
(C) Zone refining (D) Mond Process

Section B

Answer any TWO of the following questions (5M × 2 = 10M)

NOTE: In the event of the candidate attempting more than TWO questions, the first TWO questions attempted by the candidate would be evaluated.

(6) Derive the first order rate equation, its half period and graphical representation. (5M)

(7) Define the following term in Metallurgy.

(i) Leaching (3M) (ii) Calcination (2M)

(8) (i) The rate constants of a reaction at 500K and 700K are 0.02s–1 and 0.07s–1 respectively. Calculate the values of *Ea* and *A* by using Arrhenius equation (3M)

(ii) Define the Zone refining (2M)

**********End of the Paper**********