Reaction Engineering-II Class Test –I

Total marks: 15 Time: 40 min

14/09/2020

1. Tertiary butyl alcohol (TBA) was produced by liquid phase hydration (W) of isobutene (I) over a solid catalyst. Reaction is assumed to follow Eley-Rideal kinetics. [10]
   The reaction mechanism is believed to be:

   $I + S <=> I.S$
   $I.S + W <=> TBA.S$
   $TBA.S <=> TBA + S$

   Derive a rate law assuming surface reaction is rate controlling.

2. The rate law for the hydrogenation (H) of ethylene (E) to form ethane (A) over a cobalt-molybdenum catalyst is [5]

$$-r'_E = \frac{kP_E P_H}{1 + K_E P_E}$$

   Suggest with proper logic a mechanism and rate limiting step consistent with the rate law.