

Test 3 Total Marks: 20 Time: 45 min

1. (a) Explain “Effective Diffusivity” (Define it by ‘when and why’ it is used).
(b) Write the expression of effective diffusivity by explaining each term in the expression.
[3+4=7]
2. What do understand by “Thiele Modulus”? Discuss how the Thiele Modulus varies by changing different factors.
[2+3=5]
3. Make the difference between the Thiele Modulus of reversible and irreversible reactions by explaining which one is more.
[3]
4. A solid catalytic first order reaction for butane conversion is occurring at 450°C with rate of the reaction $35 \times 10^{-3} \text{ cm}^3/\text{s.g}$ of catalyst. The catalyst pore size is 95 \AA . The solid density of the catalyst is 0.95 cc with particle size 10 mm . Considering Knudsen diffusion at this small pore size and concentration of butane at pore mouth 0.25 mol/cc , predict whether the reaction is pore diffusion controlled or reaction controlled.
[5]