MECM–103

M. E./M. Tech. (First Semester) EXAMINATION, Dec., 2011

(Grading/Non-Grading System)

(Chemical Engg. Branch)

REACTOR DESIGN AND STABILITY

(MECM–103)

Time : Three Hours

Maximum Marks : GS : [illegible] NGS : [illegible]

Note : [illegible]

1. Explain [illegible] region [illegible] region [illegible] heterogeneous [illegible]

2. Derive an expression for the effectiveness factor [illegible] cylindrical catalyst pellet sealed at both ends [illegible] first order chemical reaction occurs.

3. Develop the simple one-dimensional model of the counter-current cooled packed bed reactor and analyse the thermal characteristics based on the following points :
   (a) Sensitivity of reactor to change in wall temperature
   (b) Temperature increase of feed as function of inlet temperature

4. (a) Explain bubbling gas model when an irreversible catalytic reaction is carried out in a fluidized bed reactor in the bubbling gas regime.
   (b) Describe the catalyst performance evaluation in a fluidized bed reactor.

5. Explain the modelling of trickle bed reactor based on the following points :
   (a) Flow regime transitions
   (b) Pressure drop
   (c) Liquid hold up
   (d) Gas-liquid interfacial area and mass transfer coefficient
   (e) Catalyst wetting efficiency