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Roll No .....

CM-804 (GS)

B.E. VIII Semester Examination, June 2020

Grading System (GS)

Chemical Process Modeling and Simulation

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.

1. Discuss advantages, limitations and applications of modeling in chemical industries.

2. Derive modeling equations for a batch reactor considering the following consecutive exothermic reactions.

   $A \xrightarrow{k_1} B \xrightarrow{k_2} C$

   Where both $A \rightarrow B$ and $B \rightarrow C$ have first order kinetics.

3. Compare and contrast the modeling process with the software life cycle. Analysis, design implementation, testing, documentation and maintenance.

4. Write the component continuity equations and develop a mathematical model for the CSTR with first order isothermal
   i) Reversible
   ii) Consecutive
   iii) Simultaneous reactions
   State all the assumptions made and explain the notations scheme used clearly.

5. Explain the sequential modular approach for model.

   OR

   Compare the method of averages and the method of linear least squares.

6. a) State and explain graphical interpretation of false position method. Find an approximate root at $x \log_{10} x - 1.2 = 0$ by false position method.

   b) Use the least square method to determine the equation of line of best fit for the data. Then plot the line.

x	8	2	11	6	5	4	12	9	6	1
y	3	10	3	6	8	12	1	4	9	14

7. Write down various types of data regression method and explain with suitable example.

8. Write a short note on any two of the following:
   i) Modeling of reactors
   ii) Simulation of absorber
   iii) Sources of model equations

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