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Roll No

CM-8001 (CBGS)

B.E. VIII Semester

Examination, June 2020

Choice Based Grading System (CBGS)
Chemical Process Modeling and Simulation

Time : Three Hours

Maximum Marks : 70

- Note:** i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Draw neat sketch and assume suitable data wherever you required.
1. a) Explain the classification of models and simulation. Give a detailed classification of a process models.
b) Distinguish between 'System' and 'Control volume' approaches for the development of basic transport equation. What conservation laws are used in their development?
 2. a) Explain the concept of degree of freedom and dimensional consistency in mathematical development of model.
b) How can an equation can be modeled with the help of sources of model?
 3. a) Distinguish among independent variables, dependent variables, and parameters with suitable examples.
b) Derive the energy equation applicable for a batch reactor. State all assumptions clearly.

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4. a) What are the different simulation approaches for steady state simulation?
b) Explain Muller method as iterative convergence method.
5. a) Develop a process model for double pipe heat exchanger.
b) How does the least squares method decide, which line best fits the points in a scatter plot?

6. a) Fit a power function model of the form $y = a \cdot xb$, for the given data :

X	1	2	3	4	5
Y	0.5	2	4.5	8	12.5

- b) Solve $x^3 + 2x^2 + 10x - 20$ by Newton's Raphson method (initial guess $x_0 = 1.2$).
7. a) What do you mean by Dynamic modeling?
b) Discuss the simulation of ideal binary distillation column.
8. a) Explain partitioning and precedence ordering for flow sheet.
b) Write short notes on :
 - i) Monte-Carlo simulation
 - ii) Process simulator's

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