Registration No : | | | | | | | | | | |

Total number of pages : 02 **B.Tech.**
PECE5404

8th Semester Regular Examination 2017-18
PROCESS SIMULATION AND MODELING
BRANCH : BIOTECH, CHEM, METTA, MME
Time : 3 Hours
Max Marks : 70
Q.CODE : C531

Answer Question No. 1 which is compulsory and any FIVE from the rest.
The figures in the right-hand margin indicate marks.
Assume suitable notations and any missing data wherever necessary.
Answer all parts of a question at a place.

Q1. **Answer the following questions :** **(2 x 10)**

(a) Explain transport equation.
(b) Differentiate between deterministic & stochastic process.
(c) What is variable hold up?
(d) What is the slack & surplus variable in linear programming problem?
(e) Define golden section ratio.
(f) Define lumped & distributed model.
(g) What is phase equilibrium?
(h) Define Regula-falsi method.
(i) What is information flow?
(j) Name two software for simulation.

Q2. Develop a mathematical model of binary distillation column with proper assumption and neat sketch. **(10)**

Q3. Explain the total continuity equation and component continuity equation of lumped model CSTR with neat sketch and proper chemical reaction. **(10)**

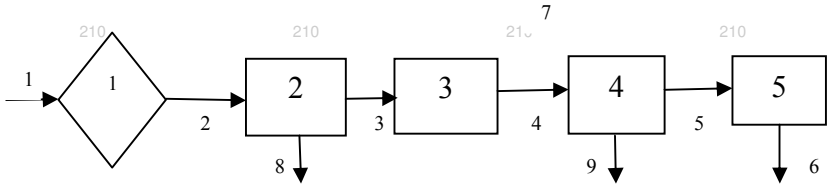
Q4. Develop the model equation for multi stage flash drum. **(10)**

Q5. Solve the following linear programming problem using Simplex method. **(10)**

Maximize $Z = x_1 + 4x_2 + 5x_3$
Subject to:
$3x_1+6x_2+3x_3 \leq 22$
$X_1+2x_2+3x_3 \leq 14$
$3x_1+2x_2 \leq 14$

Q6. Explain the energy equation for a distributed model with neat sketch. **(10)**

Q7. Find process matrix, stream connection matrix, incidence matrix, and adjacency matrix of following information flow diagram. **(10)**



Q8. **Write short notes on any TWO :** **(5 x 2)**

(a) Formulation of modeling

(b) Fibonacci method

(c) Newton's method

(d) Equation of state