Registration no:
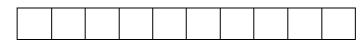

Total Number of Pages: 2

8th Semester Regular / Back Examination 2016-17
PROCESS SIMULATION AND MODELING
BRANCH: BIOTECH
Time: 3 Hours
Max marks: 70
Q.CODE: Z163
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1   **Answer the following questions:**   **(2 x 10)**
- **a)** Difference between Fibbonacci Search Algorithm and Golden Section Search Algorithm.
- **b)** Drawbacks of Fibbonacci Search Algorithm.
- **c)** What is Golden Number ?
- **d)** What is Geometric Programming Problem ?
- **e)** Define Non-linear Programming Problem.
- **f)** What is simulation ?
- **g)** Write two advantages of the simulation technique.
- **h)** Write two applications of Simulation.
- **i)** Give two limitations of simulation technique.
- **j)** Advantages of Monte Carlo Simulation.

Q2 a) Name and derive the equations for the relationships governing fluid flow,   **(5)**

b) Find the allowable regions in the s-plane for the poles of a transfer function of a system if the system response requirements are $t_r \leq 0.6$ sec, $M_p \leq 10\%$ and $t_s \leq 3$sec.   **(5)**

Q3   Minimize $f(x) = 2\,x^2 - \left[\frac{33}{x}\right]$ in interval [0,4]   **(10)**
By the Golden Section Search Method.

Q4   Solve given Geometric Programming Problem   **(10)**

$$\min f(x) = c_1 x_1 x_2 x_3 + c_2 x_1 x_2^{-1} + c_3 x_2 x_3^{-2} + c_4 x_1^{-2} x_2$$

Where $c_j > 0, x_j > 0; j = 1,2,3,4 \ and \ i = 1,2,3.$

Q5   A bakery keeps stock of a popular brand of cake. Daily demand based   **(10)**
on past experience is given below :

Daily Demand	0	15	25	35	45	50
Probability	0.01	0.15	0.20	0.50	0.12	0.02

Consider the following sequence of random numbers :
48, 78, 09, 51, 56, 77, 15, 14, 68 and 09.

    i)   Using the sequence, simulate the demand for the next 10 days.

    ii)   Find the stock situation if the owner of the bakery decides to make 35 cakes everyday.

         Also estimate the daily average demand for the cakes on the basis of simulated data.

Q6   Customers arrive at a service facility to get the required service. The   **(10)**
inter-arrival and service time are constant and are 1.8 minutes and 4
minutes respectively. Simulate the system for 14 minutes. Determine the
average waiting time of a customer and idle time of the service facility.

Q7 **a)** Describe different steps in a simulation study.   **(5)**
      b) Discuss different elements of queuing system?   **(5)**

Q8   Write down the Monte-Carlo Simulation Algorithm.   **(10)**