Roll No .....

MCA - 504(A)

MCA V Semester

Examination, December 2014

Simulation And Modeling

(Elective - II)

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) What is a system?

   b) Explain static physical model with example.

   c) Distinguish between open and closed system with examples.

   d) Name three or four of the principle entities attributes and activities to be considered if you were to simulate the operation of

      i) Cafeteria

      ii) Library

      iii) Barber shop

5. a) What do you mean by SNA?

   b) Give a classification of simulation language.

   c) How SNA increase the flexibility of GPSS models?

   d) Draw the block diagram for the simulation of super market systems using GPSS.

OR

Describe the symbol and format of any four blocks in GPSS language.

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OR

Describe in brief four guiding principles used in system modeling.

Unit - II

2. a) What do you mean by system simulation?

   b) What are the main drawback of system simulation?

   c) Discuss the Monte Carlo method.

   d) Draw Cobweb model of the following market models and determine whether market is stable or unstable

   $Q = 12.4 - 1.2P$

   $S = 8.0 - 0.6\ P_{-1}$

   $P_o = 1.0$

   $Q = S$

OR

Evaluate $\int_0^1 e^x$ using Monte Carlo method.

Unit - III

3. a) What is operational amplifier?

   b) What is analog simulation?

   c) What is overall organisation CSMP-III language?

   d) Develop CSMP-III program for automobiles wheel suspension system described by the differential equation

$$M\ddot{x} + D\dot{x} + Kx = K f(t)$$

Simulate x for M = 2.0, F = 1, K = 400, D = 0.3 and to run for a time 1.6 with time interval 0.02 and integral interval 0.002.

OR

Draw the analog computer diagram to solve the following simulation differential equation

$$2\frac{d^2x}{dt^2} + 0.1\frac{dx}{dt} + 4x = -10$$

$$x(0) = 5, \frac{dx}{dt}(0) = 0.$$

Unit - IV

4. a) Derive the exponential growth models.

   b) Explain rejection method.

   c) What is the role of pseudo-random numbers in simulation?

   d) Describe the discrete simulation process as applied to telephone system with 8 lines and 3 links. Consider both lost calls and delayed calls system.

OR

Discuss the inverse transformation method for generating non uniform continuous random number using the function

$$f(x) = \frac{1}{x + A} \qquad 0 \le x \le 1$$

$$0 \qquad \textit{elsewhere}$$