Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

Total No. of Questions : 09

BTech.(IT) (2012 to 2017 E-III) (Sem.–7,8)
MODELLING AND SIMULATION
Subject Code : BTIT-905
M.Code : 71989

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTION TO CANDIDATES :
1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

    a. Differentiate empirical distribution

    b. Define non stationary poisson process.

    c. State the queuing system represented by G/G/1/5/5.

    d. Draw only the flowchart of next-event time advance approach for discrete-event simulation.

    e. Define dynamic model.

    f. Disadvantages of simulations.

    g. Why the testing of pseudo random number is done?

    h. Define network simulator.

    i. Stochastic activities.

    j. Write the pdf and cdf for uniform distribution.

SECTION-B

2. Explain the characteristics of queueing system.

3. How could random numbers that are uniform on the interval [0, 1] be transformed into random numbers that are uniform on the interval [−11, 17]?

4. Show the exponential distribution is memory-less.

5. For the random variables X_1 and X_2 which are exponentially distributed with parameter $\lambda = 1$, compute $P(X_1 + X_2 > 2)$.

6. What is modeling and simulation? Discuss when simulation is not an appropriate tool.

SECTION-C

7. The lifetime, in years, of a satellite placed in orbit is given by the following pdf :

$$f(x) = \begin{cases} 0.4e^{-0.4x}, & x \geq 0 \\ 0, & otherwise \end{cases}$$

a. What is the probability that this satellite is still "alive" after 5 years?

b What is the probability that the satellite dies between 3 and 6 years from the time it is placed in orbit?

8. Explain the Mid-square random number generator with suitable example. Also discuss the importance of random number in simulation.

9. Explain the following :

a. Monte Carlo simulation.

b. Empirical distribution.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.