

Roll No.

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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 :

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

- 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.