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THIRD SEMESTER

END SEMESTER EXAMINATION

(Supplementary Examination)

Roll No...

B.Tech. (IT)

February-2019

**IT-207-ENGINEERING ANALYSIS AND DESIGN
(MODELLING & SIMULATION)**

Time: 03 Hours

Max. Marks: 50

Note: Attempt total FIVE questions.

Assume suitable missing data, if any.

Question No. 1

[2x5=10]

- [a] What is significance of mean, mode and median of a data distribution?
- [b] Define simulation? And discuss when study via simulation is appropriate.
- [c] What are the applications areas of simulation?
- [d] Describe the component of the system.
- [e] What is limitation of mid square method of generation of random number sequences.

Question No. 2

[5x2=10]

- [a] Compare the simulation techniques with the analytical methods to study a system.
- [b] Explain an inventory model defining all decision variables.

Question No. 3

[2x5=10]

In a random number generation process, there are two unbiased dice and these are thrown multiple times. Find the probability that

- [a] The first dice shows 6
- [b] Both digit drawn are odd.
- [c] Total sum of numbers on dice is 8.
- [d] First digit is odd
- [e] Both the dice show the same number of digit

Question No. 4

[5x2=10]

- [a] A machine produces 20 % products defective and determine the probability that out of 4 product chosen at random (i) 1 (ii) 0 (iii) less than 2 products will be defective?

- [b] The mean height of 1000 students is 42 and standard deviation is 24. Find the number of students exceeding a height of 50.

Question No. 5

[10]

A confectioner keeps stock of product brand of cake and previous data for daily demand is given as:

Table 1: Distribution for demand

| Demand | 0 | 10 | 20 | 30 | 40 | 50 |
|-------------|------|------|------|------|------|------|
| Probability | 0.01 | 0.20 | 0.15 | 0.50 | 0.12 | 0.02 |

The sequence of random number is given as 48, 78, 19, 51, 56, 77, 15, 14, 68, 9. Using the above demand distribution simulate the demand for next 10 days and find the average daily demand.

Question No. 6

[5x2=10]

- [a] Generate a 10 random number sequence using mid square method the seed value is 4168.
- [b] A random number generator generates six number sequences such as 0.4, 0.81, 0.14, 0.05, 0.93 and 0.12. Test the uniformity of generated random number sequences using Kolmogorov-Smirnov test with significance level 0.02. Kolmogorov-Smirnov distribution Table is given below, where n and α are the degree of freedom and significance level respectively.

| $n \backslash \alpha$ | 0.001 | 0.01 | 0.02 | 0.05 | 0.1 | 0.15 | 0.2 |
|-----------------------|---------|---------|---------|---------|---------|---------|---------|
| 1 | | 0.99500 | 0.99000 | 0.97500 | 0.95000 | 0.92500 | 0.90000 |
| 2 | 0.97764 | 0.92930 | 0.90000 | 0.84189 | 0.77639 | 0.72614 | 0.68377 |
| 3 | 0.92063 | 0.82900 | 0.78456 | 0.70760 | 0.63604 | 0.59582 | 0.56481 |
| 4 | 0.85046 | 0.73421 | 0.68887 | 0.62394 | 0.56522 | 0.52476 | 0.49265 |
| 5 | 0.78137 | 0.66855 | 0.62718 | 0.56327 | 0.50945 | 0.47439 | 0.44697 |
| 6 | 0.72479 | 0.61660 | 0.57741 | 0.51926 | 0.46799 | 0.43526 | 0.41035 |
| 7 | 0.67930 | 0.57580 | 0.53844 | 0.48343 | 0.43607 | 0.40497 | 0.38145 |