Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME- SEMESTER II– EXAMINATION – SUMMER 2015

Subject Code: 2725010 **Date: 26/05/2015**

Subject Name: SIMULATION MODELING OF MANUFACTURING SYSTEM

Time: 2:30 PM – 5:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Explain steps involved in simulation study. **07**

(b) Differentiate between discrete and continuous system with suitable example. **07**

Q.2 **(a)** Enlist various application areas of simulation and explain any two with suitable example. **07**

(b) Consider a bank counter where technical person provide service. Two technical support people exist. One is able more experienced, provide faster service. Second is Baker newbie, provides slower service. Find out how well the current rule works. Rule: 1 Able gets customer if both people are idle. Rule: 2 Baker gets customer if both are idle assign randomly to able and baker. **07**

Interval Distribution

Interval Time(min.)	Probability	Cumulative Probability	Random digit assignment
1	0.25	0.25	1-25
2	0.4	0.65	26-65
3	0.2	0.85	66-85
4	0.15	1	86-00

Service Time Distribution (Baker)

Service Time(min.)	Probability	Cumulative Probability	Random digit assignment
3	0.35	0.35	1-35
4	0.25	0.6	36-60
5	0.2	0.8	61-80
6	0.2	1	81-00

Service Time Distribution(Able)

Service Time(min.)	Probability	Cumulative Probability	Random digit assignment
2	0.30	0.3	1-30
3	0.28	0.58	31-58
4	0.25	0.83	59-83
5	0.17	1	84-00

Write down the algorithm and show first four simulations for the distributions.

OR

(b) Compare the real system result with results from simulation and find out whether the results are valid for the 90% confidence interval. [Assume $t_{9,.90}$: 1.833] **07**

Runs	1	2	3	4	5	6	7	8	9	10
Real system	172.6	134.2	115.5	132.6	155.9	116	178.5	152.2	99.2	117.3
Simulation results	136.8	159.3	118.1	119.6	112.9	121.6	164.8	126.8	95	147.4

Q.3 **(a)** Explain Triangular distribution and enlist its applications. Find Probability (6.5 <X<8) for a triangular distribution with minimum value *a*=1, maximum value *b*=9 and peak value *c*=6. **07**

(b) Describe the need for output data analysis. Explain ñterminating simulationò with suitable example. **07**

OR

Q.3 **(a)** Explain and derive its mean and variance. Give some applications of Weibull distribution in manufacturing systems **07**

(b) Enlist the possible validation techniques in order of increasing cost-to value ratios. **07**

Q.4 **(a)** What is ñQueuing Systemò? Give at least three examples of real world queuing system with their servers and Customers. **07**

(b) Explain the model-building process with need for verification and validation. **07**

OR

Q.4 **(a)** Enlist the techniques for increasing the validity and credibility of a simulation model. Explain any one with suitable example. **07**

(b) Explain Inverse Transform techniques for random variate generation with suitable example. **07**

Q.5 **(a)** Describe the criteria for evaluation and selection of simulation software. **07**

(b) Enlist the advantages and disadvantages of using a simulation packages over general purpose programming languages. **07**

OR

Q.5 **(a)** What are the desirable software features? Explain any two of them. **07**

(b) Define the following components found in discrete event simulation models. **07**
(i)Simulation clock (ii) Event routine (iii) Report generator

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