



SOMAIYA
VIDYAVIHAR UNIVERSITY

27/2/24

Semester: January 2024 – May 2024		
Maximum Marks 30	Examination: In-Semester Examination	Duration :1.15 hrs.
Programme code: 04	Class: TY	Semester: VI (SVU 2020)
Programme: IT		
Name of the Constituent College: K. J. Somaiya College of Engineering		Name of the department: IT
Course Code: 116U04C602	Name of the Course: Modeling and Simulation	

Question No.		Max. Marks																						
Q1	<p>There is only one telephone in a public booth of a railway station. The following tables indicate the distributions of callers' arrival time and duration of the calls.</p> <table border="1"><tr><td>Time between arrivals (Minutes)</td><td>5</td><td>6</td><td>7</td></tr><tr><td>Probability</td><td>0.20</td><td>0.70</td><td>0.10</td></tr></table> <table border="1"><tr><td>Call duration (Minutes)</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Probability</td><td>0.15</td><td>0.6</td><td>0.15</td><td>0.1</td></tr></table> <p>Simulate for 10 arrivals of the current system. It is proposed to add another telephone to the booth. Justify the proposal based on the waiting time of callers.</p> <p style="text-align: center;">OR</p> <p>A small barbershop has only one checkout counter. Customers arrive at this checkout counter at random from 1 to 7 minutes apart. The service time varies from 1 to 5 minutes. Each possible value of inter arrival time and service time have the same probability of occurrence. Simulate the system for arrival of 10 customers. Analyze the system based on</p> <ol style="list-style-type: none">1. Average waiting time2. Probability that a customer waits in queue. <p>Assume random numbers for time between arrival/ inter arrival time and service time as given below:</p> <table border="1"><tr><td>Random Digits</td><td>109, 93, 15, 948, 309, 235, 302, 727, 534</td></tr><tr><td>Random Digits</td><td>38, 64, 89, 10, 23, 96, 17, 91, 25, 5</td></tr></table>	Time between arrivals (Minutes)	5	6	7	Probability	0.20	0.70	0.10	Call duration (Minutes)	2	3	4	5	Probability	0.15	0.6	0.15	0.1	Random Digits	109, 93, 15, 948, 309, 235, 302, 727, 534	Random Digits	38, 64, 89, 10, 23, 96, 17, 91, 25, 5	10
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Q2	<p>Using the multiplicative congruential method, find the period of the generator for $a=13$, $m=2^6=64$ and $X_0=1, 2, 3$, and 4.</p>	10																						

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Q3	Define Static Simulation, Dynamic simulation, Primary activity, State of System and Model with respect to System. Give example for each with respect to Banking System.	10
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