

IV B.Tech. II Semester Supplementary Examinations, July -2005

SIMULATION & MODELLING

(Common to Computer Science & Engineering and Mechatronics)

Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. (a) What are the major segments used in corporate model? Explain each segment.
(b) What are different types of system study? Explain each.
2. (a) Discuss with an example how simulation is done for a continuous model.
(b) Discuss with an example how simulation is done for a discrete model.
3. (a) Define system dynamics.
(b) Draw the structure of system dynamics model and explain with one example.
(c) Differentiate exponential growth model and exponential decay model.
4. (a) Explain the Monte-Carlo method.
(b) Discuss some of the applications of Monte-Carlo method.
(c) Is Monte-Carlo method a simulation technique ? Justify your answer
5. A production department has 20 identical machines. The run time until failure of a machine occurs is exponentially distributed with a mean of 10 hours. Repair times are uniformly distributed between 2 and 6 hours. Develop a simulation model to find.
 - (a) how many repair persons are needed to ensure that the mean number of machines running is greater than 16.
 - (b) if there are 4 repair persons, estimate the expected number of machines, that are either running or being served.
6. (a) Explain counters and summary statistics used in simulation studies.
(b) Explain the common method of summing the squares while computing the standard deviation.
(c) Under what circumstances double precision calculations are needed while simulation.
7. Parts are produced by a machine tool at the rate of one every five minutes. Each part is inspected for 4 ± 3 minutes and 10 % are rejected. Write a SIMSCRIPT program to simulate the system.
8. With the help of a case situation illustrate the execution of simulation algorithm using GPSS.

IV B.Tech. II Semester Supplementary Examinations, July -2005**SIMULATION & MODELLING****(Common to Computer Science & Engineering and Mechatronics)****Time: 3 hours****Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Briefly explain the various principles used in modeling.
(b) Consider an automobile wheel suspension system with the body to have a mass of M_1 and assume that its motion is determined by the force of gravity and the reaction with the suspension system. Construct a simulation model for the motions of the wheel and body.
2. (a) Explain the distributed lag model with an example.
(b) Give the advantages of distributed lag model compared to other models.
3. (a) Define hybrid simulation.
(b) Explain simulation of an autopilot.
(c) Explain Real time simulation
4. (a) Explain the Monte-Carlo method.
(b) Discuss some of the applications of Monte-Carlo method.
(c) Is Monte-Carlo method a simulation technique ? Justify your answer
5. There are 2 workers that are responsible for 10 milling machines. The machines run on the average for 20 minutes, then require an average 5 minutes service period and both the times are exponentially distributed. Determine the various measures of performance, by assuming 0.692 as the probability that an arrival has to wait for service and 0.854 as the efficiency factor.
6. (a) Illustrate the general flow of control during the execution of simulation program with suitable diagram and explain it.
(b) Discuss the following:
 - i. Counters
 - ii. Utilizety
 - iii. Occupancy
7. Parts are produced by a machine tool at the rate of one every five minutes. Each part is inspected for 4 ± 3 minutes and 10 % are rejected. Write a SIMSCRIPT program to simulate the system.
8. (a) Discuss the permanent and temporary entities with respect to SIMSCRIPT and GPSS.
(b) Discuss the implementation of Activities in SIMSCRIPT and GPSS.

IV B.Tech. II Semester Supplementary Examinations, July -2005**SIMULATION & MODELLING****(Common to Computer Science & Engineering and Mechatronics)****Time: 3 hours****Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Give two examples for Continuous and discrete systems.
(b) Ships arrive at a port. They dock at a berth if one is available. Otherwise they wait until one becomes available. They are unloaded by one of the several work gangs whose size depends upon the ship's tonnage. A ware-house contains a new cargo for the ship. The ship is loaded and then departs. Identify the entities, attributes, activities and events for the system.
2. (a) Explain the distributed lag model with an example.
(b) Give the advantages of distributed lag model compared to other models.
3. (a) Define hybrid simulation.
(b) Explain simulation of an autopilot.
(c) Explain Real time simulation
4. (a) What are called stochastic variables?
(b) Explain discrete and continuous probability functions
(c) What are the important measure of probability functions?
5. There are 2 workers that are responsible for 10 milling machines. The machines run on the average for 20 minutes, then require an average 5 minutes service period and both the times are exponentially distributed. Determine the various measures of performance, by assuming 0.692 as the probability that an arrival has to wait for service and 0.854 as the efficiency factor.
6. (a) Explain the role of state descriptor in discrete system simulation.
(b) Define the terms
 - i. Discrete event
 - ii. Simulation time
 - iii. Clock time
(c) Explain representation of time in discrete system simulation.
7. Parts are produced by a machine tool at the rate of one every five minutes. Each part is inspected for 4 ± 3 minutes and 10 % are rejected. Write a SIMSCRIPT program to simulate the system.
8. (a) Discuss the permanent and temporary entities with respect to SIMSCRIPT and GPSS.

(b) Discuss the implementation of Activities in SIMSCRIPT and GPSS.

IV B.Tech. II Semester Supplementary Examinations, July -2005**SIMULATION & MODELLING****(Common to Computer Science & Engineering and Mechatronics)****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions
All Questions carry equal marks**

1. (a) Explain the following with an example: System, Entity, Attribute, Activity, State of the system.
(b) Differentiate between stochastic and deterministic system activities with examples
2. (a) Compare simulation and analytical methods.
(b) What are distributed lag and Cobweb models and explain each
3. (a) Explain about analog computers and analog methods used in simulation.
(b) Discuss about hybrid computers and digital-analog simulators.
4. (a) Explain the Monte-Carlo method.
(b) Discuss some of the applications of Monte-Carlo method.
(c) Is Monte-Carlo method a simulation technique ? Justify your answer
5. Explain
 - (a) Erlang distribution.
 - (b) Hyper-Exponential distribution.
 - (c) Normal distribution.
6. Compute the telephone system simulation assuming the inter-arrival time is exponentially distributed and the call lengths are normally distributed. The mean inter-arrival time is 20 and the calls have a mean length of 80 with a standard deviation of 20. Use the following tables :-

T1: Table for generating Exponential Distribution :-

I	0	.100	.200	.300	.400	.500	.600	.700	.750	.800
O	0	.104	.222	.355	.509	.690	.915	1.20	1.38	1.60
S	1.04	1.180	1.330	1.540	1.810	2.250	2.850	3.600	4.400	5.750

.84	.88	.90	.92	.94	.95	.96	.97	.98	.99	.995	.998	.999	.9997
1.83	2.12	2.30	2.52	2.81	2.99	3.20	3.50	3.90	4.60	5.30	6.20	7.00	8.00
7.25	9	11	14.5	18	21	30	40	70	140	300	800	3333	-

I – Input; O-Output; S-Slope

T2: Table of Random Digits :-

10097,37542,08422,99019,12807/66065,31060,85269,63573,73796/98520,11805,83452,88685,
99594/65481,80124,74350,69916,09893/91499,80336, 44104,12550,63606/

Generate the call arrivals by using T1 and T2.

7. (a) Write a brief notes on GPSS with its historical background.
(b) Describe the features that makes the GPSS, a good language for simulating queing systems.
8. What are conditional events? How are they represented? Explain with the help of an illustrative case Situation.
