



SF-7145

B. E. - III (Sem. - VI) (I.T.) Examination

May/June - 2011

Simulation & Modeling

Time : 3 Hours]

[Total Marks : 100

Instruction :

(1)

नीचे दृष्टावेव निशानीवाणी विगतो उत्तरवडी पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="B. E. - 3 (SEM. - 6) (I.T.)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="SIMULATION AND MODELING"/>	<input type="text"/>
Subject Code No. : <input type="text" value="7"/> <input type="text" value="1"/> <input type="text" value="4"/> <input type="text" value="5"/>	<input type="text" value="Student's Signature"/>
Section No. (1, 2,.....) : <input type="text" value="Nil"/>	

- (2) Figures to extreme right indicate maximum marks.
(3) Make necessary assumptions, if required.

1 (A) (1) State True or False: [04]

- In simulation, an attempt is made to copy a real system and the parameters are manipulated in an artificial environment.
- "Power Residue Generator" is not Truly Random.
- Simulation is an optimizing technique.
- Round-off errors are introduces because of the limited size of the computer word.

(2) Do as directed: [06]

- Give the difference between: Analytical Solution and Simulation.
- Give a brief note on Simulation for business executive.
- What is Pure Pursuit Problem? Which are the negative points of this simulation?

(B) Answer the following questions:

(1) What do you mean by the term "SIMULATION"? State the advantages and disadvantages. [04]

(2) Explain Inventory Control System in brief. [06]

2 (A) State the difference between continuous and discrete system. Which different models are used for the flow of time in discrete system? Also explain any one model with flowchart. Which model is preferable to use on digital computer? [08]

(B)

No	Range	No. of Observed Occurrences	No	Range	No. of Observed Occurrences
1.	000-099	463	6.	500-599	495
2.	100-199	529	7.	600-699	480
3.	200-299	468	8.	700-799	515
4.	300-399	508	9.	800-899	426
5.	400-499	497	10.	900-999	519

Above, the actual frequency counts of numbers generated are given for a sequence of 5000 three digit numbers. In this examples, $E_i = 500$ (Expected occurrence for each examples).

Find out χ^2 , and find how well certain observed data fit the theoretically expected data using the chi-square test. Chi-square table for degree of freedom = 9 is given below:

.995	0.99	0.95	0.90	0.75	0.50	0.25	0.10	0.05	0.01	.005
1.73	2.09	3.33	1.17	5.90	8.34	11.4	14.7	16.9	21.7	23.6

OR

(B) Discuss the Water Reservoir System with flowchart. Also list out limitations of the simulation of this system. [07]

3 Attempt the following Questions : (Any Three) [15]

- (1) Discuss the Servo System in detail.
- (2) Explain "Power Residue Generator".
- (3) Discuss the Chemical reactor problem in detail.
- (4) Write a short note on "Normal Distribution".

4

(A) Answer the following. [10]

- (1) State True or False.
"Arrival of passengers from aeroplanes at an airport is an example of individual arrivals of customers.
- (2) What do you mean by priority based queuing system? Give an example.
- (3) What was the role of A.K. Erlang in queuing theory ?
- (4) Give the basic difference between PERT and CPM.
- (5) State True or False.
"In situations where the demand is given and uniform and there is no variation in the lead time, no safety stock is required to be kept."
- (6) Define the term: Slack
- (7) A queue is a _____ for service.
- (8) Give any two elements for an inventory system.
- (9) State True or False.
"Safety stock increases as demand increases."

(10) Correct the following statement if incorrect.
 “An expectation of a long waiting time, particularly when there are limits on the time and extent of storage capacity available, an arriving customer may balk.”

- (B) Discuss the following terms with proper illustrations ,if required. [10]
 (1) Balking and Reneging
 (2) Birth and Death Process
 (3) Delivery lag
 (4) slack
 (5) Criticality index

5 (A) Attempt any two. [12]

- (1) Explain Forecasting and Regression Analysis.
 (2) Arrivals at telephone booth are considered to be Poisson, with an average time of 14 minutes between one arrival and the next. The length of a phone call is assumed to be distributed exponentially, with mean 5 minutes, find
 (a) The probability that an arrival finds that four persons are waiting for their turn.
 (b) The average number of persons waiting and making telephone calls.

(3) Discuss backward pass with its flowchart in concerned with critical path computation.

(B) What is queuing theory? What type of questions are sought to be answered in analyzing a queuing system? [03]

6

(A) XYZ consultants have identified the following ten major activities in a project to promote a new product. [08]

Activity	Predecessors	Durataion (weeks)
A	-----	3
B	A	6
C	A	4
D	A	3
E	B,C,D	1
F	A	4
G	D	5
H	A	5
I	H	1
J	G	2

Draw a PERT network to represent this project.

- (B) (1) Assume two N- server queuing systems, single (common) queue for all N- servers and N separate (individual) queues for N- servers. Compare these two queuing systems and also state which queuing system is preferred out of these two ? [04]
 (2) Discuss Batch Arrivals and Batch Service in brief. [03]

OR

- (A) Assume a queuing system with two servers, say S1 and S2. [08]
Calculate and tabulate the results of CAT, CDT, IDT, WT and QL
for the following information.
AT={0,5,2,10,20,9,8,10}
ST={10,5,2,30,5,5,10,10}
- (B) Derive an equation for Economic Reorder Quantity Q (EOQ) and [07]
Daily Minimum Cost C for a system in which it runs out of stock for
a certain fraction of time. Define all the assumptions made in the
system.
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