Roll No. ..... Total Pages : 04

BT-8/M-14 **8850**

OPERATION RESEARCH

ME-406-E

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. Define a scientific model. Discuss in detail the three types of models with special emphasis on the important logical properties and the relationships the three types bear to each other and to modelled entitles. **20**

2. Maximize $Z = 4X_1 + 5X_2$,

$$X_1 + X_2 \geq 1$$
$$-2X_1 + X_2 \leq 1$$
$$4X_1 - X_2 \geq 1$$
$$X_1, X_2 \geq 0$$ **20**

Unit II

3. Determine an initial basic feasible solution to the following T.P. using Vogel's approximation method. **20**

		Destination					
		A_1	B_2	C_3	D_4	E_5	Supply
	A	2	11	10	3	7	4
Origin	B	1	4	7	2	1	8
	C	3	9	4	8	12	9
Demand		3	3	4	5	6	

4. (a) "PERT provides the framework with which a project can be described, scheduled and the controlled." Discuss. **6**

(b) Given is the following information regarding a project : **14**

Activity	Required preceding Activity	Duration (days)
A	None	3
B	None	4
C	None	2

D	A,B	5
E	B	1
F	B	3
G	F,C	6
H	B	4
I	E,H	4
J	E,H	2
K	C,D,F,J	1
L	K	5

(i) Draw the network for above project.

(ii) Determine the critical path and duration of the project.

(iii) Find three types of floats for each activity.

Unit III

5. What is decision-making under uncertainty ? What are the assumptions in decision-making under uncertainty ? What are its limitations ? Give some examples. **20**

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6. A man has the choice to running either a hot-snack stall or an ice-cream stall at the sea side resort during the summer season. If it is a fairly cool summer he would make Rs. 5,000 by running hot snack stall, but if summer is quite hot he can only expect to make Rs. 1,000. On the other hand, if he operates ice-cream stall, his profit is estimated as Rs. 6,500 if summer is hot, 1000 if it is cool. There is a 40% chance of summer being hot. Should he opt for running the hot-snack stall or ice-cream stall ? Give mathematical argument. **20**

Unit IV

7. (a) What is queue ? Give an example and explain the basic elements of queue. **6**

(b) What do you understand by queuing structure ? Explain (i) First come first served, (ii) last come first served (iii) service is random basis for customer handling. **14**

8. In a banking Co., the arrival rate of customers is 12 per hour while the service rate of customers is 30 customers per hour. Determine :

(i) The idle rate for banking Co.

(ii) What is the probability that there are more than 2 customers in the counter ? **20**

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