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Printed Pages : 4 **MBA – 213**

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 7064 Roll No. | | | | | | | | | | |

M. B. A.

(SEM. II) EXAMINATION, 2006-07

OPERATIONS RESEARCH

Time : 3 Hours] *[Total Marks : 100*

1 Answer any **four** of the following in about **250** words each : **5×4=20**

(a) "Decision criteria under situation of uncertainty is governed by the attitude of the decision maker." - Explain.

(b) What is operations research? State any four applications.

(c) "Linear programming is one of the most frequently and successfully used operations research technique to managerial and business decisions." Elucidate.

(d) "The primary contribution of the game theory has been its concepts rather than its formal application to solving real problem." - Explain.

(e) What is replacement problem? Discuss some important replacement situations and policies.

(f) What kind of decision-making situation may be analysed using PERT and CPM techniques?

2 (a) A physician purchases a particular vaccine on Monday each week. The vaccine must be used within the following week, otherwise it becomes worthless. The vaccine cost Rs. 30 per dose. **10**

and the physician charges Rs. 50 per dose. In the past 50 weeks, the physician has administered the vaccine in the following quantities :

Doses per week	20	30	50	60
Number of weeks	5	15	20	10

Determine how many doses the physician buys every week.

(b) Solve the following LPP : **10**

Minimize : $Z = 40\ X + 24\ Y$

Subject to : $20\ X + 50\ Y \geq 4{,}800$

$80\ X + 50\ Y \geq 7{,}200$

and $X, Y \geq 0$

Also write its dual.

OR

2 (a) Find an optimal solution to the following transportation problem : **10**

Sources	***Destination***			***Supply***
	X	***Y***	***Z***	
A	2	7	4	50
B	3	3	7	70
C	5	4	1	80
D	1	6	2	140
Demand	70	90	180	340

(b) Suggest optimum solution to the following assignment problem and also the maximum sales : **10**

Salesmen	***Markets (Sales in lakhs Rupees)***			
	I	***II***	***III***	***IV***
A	44	80	52	60
B	60	56	40	72
C	36	60	48	48
D	52	76	36	40

3 (a) What do you understand by queuing model? Why do the 'arrivals' and 'services' follow the Poisson and Exponential distribution respectively. **10**

(b) Solve the following game : **10**

Player Y

$$\text{Player X} \begin{pmatrix} 6 & 3 & -1 & 0 & -3 \\ 3 & 2 & -4 & 2 & -1 \end{pmatrix}$$

OR

3 (a) What is simulation? What are its managerial uses ? Explain in brief. **10**

(b) A manufacturing firm has come to know from his past records that a machine costing Rs. 56,000/- is not working satisfactorily in spite of its regular maintenance. With a view to replacing this machine the following facts were obtained : **10**

Year	*Annual running cost (Rs)*	*Resale value (Rs.)*
1	7,000	28,000
2	9,100	14,000
3	11,900	8,400
4	15,400	4,200
5	20,300	3,500
6	26,600	3,000
7	33,600	3,000
8	42,000	3,000

When should the machine be replaced?

4 (a) Distinguish between PERT and CPM. **10**

(b) Draw a network diagram on the basis of the following data : **10**

Activity	*Duration (days)*	*Activity*	*Duration (days)*
1-2	2	4-8	8
1-4	2	5-6	4
1-7	1	6-9	3
2-3	4	7-8	3
3-6	1	8-9	5
4-5	5	9-10	2

Find the critical path, total duration and slack times.

OR

4 (a) How are PERT and CPM techniques useful in managerial decision making? **10**

(b) A confectioner sells confectionary items. Past data of demand per week in hundred kilograms with frequency is given below : **10**

Demand (in week) :	0	5	10	15	20	25
Frequency :	2	11	8	21	5	3

Using the following sequence of random numbers, generate demand for next 15 weeks. Also find out the average demand per week :

Random numbers :

35 52 90 13 23
73 34 57 35 83
04 17 99 27 13

5 Write short notes on any **two** of the following : **10+10**

(a) Johnsons Algorithm for ***n*** jobs and 3 machines.

(b) Replacement of equipments which fail suddenly.

(c) Crashing and resource leveling of operations.

(d) Application of queuing model for better service to the customers.
