

OPERATIONS RESEARCH (2013 Scheme)

Time: 3 Hours

Max Marks: 100

- Answer all the questions
- *Ordinary calculator can be used*

Essays:**(2x20=40)**

1. An equipment is to be transported from origins A, B, C to destination E, F, G, H. The supply at the origins, the demand at the destination and time of shipment is given. Work out a transportation plan so that time required for shipment is the minimum.

		Destination				Supply
		E	F	G	H	
Origin	A	10	22	0	22	8
	B	15	20	12	8	13
	C	20	12	10	15	11
Demand		5	11	8	8	

2. There are 4 machines and 4 jobs, Job i when carried out on machine j results in a production cost of (ij) units (1 unit=Rs100) as presented in the cost matrix given below. The objective is to obtain an assignment that minimizes the total cost incurred

		Machines (j)			
		M ₁	M ₂	M ₃	M ₄
Jobs (i)	J ₁	3	5	10	11
	J ₂	8	8	12	6
	J ₃	3	13	9	7
	J ₄	5	8	10	2

Short Essays:**(2x10=20)**

3. A service machine always has a stand by unit for immediate replacement upon failure. The time to failure of the machine (or its stand by unit) is exponential and occurs every 5 hours, on the average. The machine operator claims that the machine "has the habit" of breaking down every night around 8:30p.m. Analyze the operator claim.
4. Draw a network diagram for the following activity. Calculate the start time and finish time.

Activity	Description	Predecessor	In weeks		
			Optimistic time (O)	Pessimistic time (P)	Most likely time (M)
A	Select administrative and medical staff	-	9	15	12
B	Select site and do site survey	-	5	13	9
C	Select equipment	A	8	12	10
D	Prepare final construction plans and layout	B	7	17	9
E	Bring utilities to the site	B	18	34	23
F	Interview applicant and fill positions in nursing support staff, maintenance and security.	A	9	15	9
G	Purchase and take delivery of equipment.	C	30	40	35
H	Construct the hospital	D	35	49	39
I	Develop an information system.	A	12	18	15
J	Install the equipment	E, G, H	3	9	3
K	Train nurses and support staff	F, I, J	7	11	9

Short notes:**(8x5=40)**

- Graphical representation of linear programming.
- Significance of operation research (OR) technique in management.
- Role of event in network diagram and types of events.
- The following is a pay off matrix

	Y	
	1	-2
X	2	1

What is the value of the game? Who will be the winner of the game? Why? "

9. Role of demand in developing of inventory models.
10. What is meant by critical path method. Describe the importance of different time estimates calculated in this approach.
11. Explain Vogel's approximation method
12. Steps in decision making.
