

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA-II Semester Supplementary Examinations, February 2010
OPERATIONS RESEARCH

Time: 3hours

Max.Marks:60

Answer any Five questions
All questions carry equal marks

- 1.a) Discuss scientific methods of OR.

b)

$$\text{Max } Z = 3x_1 + 2x_2$$

$$\text{ST } 2x_1 + x_2 \leq 1$$

$$3x_1 + 4x_2 \geq 4$$

$$x_1, x_2 \geq 0$$

2. Solve the given transportation problem for the minimum transportation problem for the minimum transportation cost. Also find the alternate optimal solution if any.

		To			
From		A	B	C	Supply
	X	4	8	8	76
	Y	16	24	16	82
	Z	8	16	24	77
	Demand	72	102	41	

3. Use graphical method to find the minimum time elapsed of 2 jobs on 5M/cs.

		Sequence	A	B	C	D	E
Job 1	time		2	3	4	6	2
		Sequence	C	A	D	E	B
Job 2	time		4	5	3	2	6

4. An individual is planning for a car. A new car will cost Rs. 1, 20, 000. The resale value of the car at the end of the year is 85% of the previous year value. Maintenance and operation costs during the first year are Rs. 20, 000 and they increase by 15% every year. The minimum resale value of the car can be Rs. 40,000.

i) When should the car be replaced to minimize average annual cost.

ii) If interest rate is 12% when should the car be replaced.

5. Trains arrive at the yard every 15 minutes and the service time is 33 minutes. If the line capacity of the yard is limited to 5 trains, find the probability that the yard is empty and the average number of trains in the system.

Cont...2

6. A particular item has a demand of 9000 units per year. The cost of one procurement is Rs. 100, holding cost per unit is Rs. 2.40 per year and the cost of shortage is Rs. 5 per unit per annum. Determine
- economic lot size
 - The number of orders per year
 - The time between orders
 - The total cost per year if the cost of 1 unit = Rs. 1
7. Solve the following game

Player B

Player A

4	2	0	2	1	1
4	3	1	3	2	2
4	3	7	-5	1	2
4	3	4	-1	2	2
4	3	3	-2	2	2

8.

$$\text{Max } z = 3x_1 + 4x_2$$

$$\text{ST } 2x_1 + 3x_2 \leq 24$$

$$x_1 \leq 6$$

$$x_1, x_2 \geq 0$$

using dynamic programming