Code No: NR311303 **NR**

III B.Tech I Semester Supplementary Examinations, May 2005
OPERATIONS RESEARCH
(Electronics & Control Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain briefly the general methods for solving OR models.
   (b) Find the minimum of the function
   Z = 2x y
   subject to the constraints
   x + y≤ 5
   x + 2y ≥ 8
   x, y ≥ 0
   Use the graphical method

2. A firm manufacturing a single product has plant I, II, III. The three plants have sproduced 60,35 and 40 units respectively during this month. The firm had madea commitment to sell 22 units to customer A, 45 units to customer B, 20 units to customer C, 18 units to customer D, and 30 units to customer E. Find the minimum possible transportation cost of shipping the manufactured product to five customers the net per unit cost of transporting form the three plants to five customers is given in the table :

	A	B	C	D	E
I	4	1	3	4	4
II	2	3	2	2	3
III	3	5	2	4	4

3. (a) Write short notes on sequencing decision problem for n jobs on two machines.
   (b) Alpha corporation has four plants each of which can manufacture any of the four products. Production costs differ from plant to plant as do sales revenue. From the following data, obtain which product each plant should produce to maximize profit :

Sales Revenue (Rs.'000 s)					Production Costs (Rs.'000 s)				
Plant	Production				Plant	Production			
	1	2	3	4		1	2	3	4
A	50	68	49	62	A	49	60	45	61
B	60	70	51	74	B	55	63	45	69
C	55	67	53	70	C	52	62	49	68
D	58	65	54	69	D	55	64	48	66

4. (a) Explain briefly "how the replacement problems are classified"?
   (b) Fleet of cars have increased their costs as they continue in service due to increased direct operating cost (gas and oil) and increased maintenance (repairs,

tyres, batteries,etc..).The initial cost is Rs.3,50,000 and the trade in value drop as time passes until it reaches a constant value of Rs.40,000. Given the cost of operating, maintaining and the trade in value, determine the proper length of service before cars should be replaced.

Years of service	1	2	3	4	5
Year end trade in value(Rs.)	2,90,000	2,10,000	1,50,000	1,10,000	40,000
Annual operatiing cost (Rs.)	11,500	12,800	13,600	14,000	15,000
Annual maintaining	3000	5000	8000	12,000	15,000

5. (a) Briefly explain
   i. pure strategy
   ii. mixed strategy
   iii. optimal strategy

   (b) Find the saddle point, optimum strategies and value of the game in the following pay off matrix

		Y			
		A	B	C	D
X	I	-3	4	2	9
	II	7	8	6	10
	III	6	2	4	-1

6. (a) What do you mean by the following
   i. Queue discipline
   ii. Input and holding times

   (b) A service station operates a computerized order delivery service. The computer can deliver an order every 20 minutes and actual delivery requires 30 minutes. Determine
   i. the total number of orders that have been delayed after the start of days work if 30 orders were placed prior to start up.
   ii. the total elapsed time until the facility is idle.

7. (a) What are costs that are involved in carrying inventory? Explain them in detail

   (b) A small firm producing automobile brake linings estimates the steel requirements for the next years production at 6000 Kg. The cost of carrying steel in inventories works out to Rs 1 per Kg. Per month. The cost of ordering works out at Rs 100 per order. If the cost per kg of steel is Rs 100, find out the economic order quantity, the number of orders per year, and total cost incurred by the firm for one year.

8. (a) Define dynamic programming problem. List and explain the terminologies of Dynamic Programming problem. What are the application areas of Dynamic Programming?

   (b) Write a short notes on decision tree and Bellman's principle of optimality.

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