R09

Code No: C0707

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I Semester Examinations March/April 2011
OPERATIONS RESEARCH
(ELECTRICAL POWER SYSTEMS)

Time: 3hours **Max.Marks:60**

Answer any five questions
All questions carry equal marks
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1. Use Big M method to maximize $Z = 6X_1 + 4X_2$
Subject to the constraints
$2X_1 + 3X_2 \leq 30$
$3X_1 + 2X_2 \leq 24$
$X_1 + X_2 \geq 3$ and $X_1, X_2 \geq 0$
Is the solution unique? If not give two different solutions. [12]

2. A Company has three plans at locations A, B and C, which supply to warehouses located at D, E, F, G and H. Monthly plant capacities are 800, 500 and 400 units respectively. Unit transportation costs (in hundreds of rupees) are given below:

From/To	D	E	F	G	H
A	5	8	6	6	3
B	4	7	7	6	6
C	8	4	6	6	3

Monthly warehouse requirements fare 400, 400, 500, 400 and 800 units respectively. By using vogets approximation method determine on optimum distribution for company, in order to minimize the total transportation cost. [12]

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. '000s)					Production Costs (Rs. '000 s)				
Plant	Product				Plant	Product			
	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

[12]

Contd…2

4. 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

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

[12]

5. Obtain the functional equations of the dynamic programming for solving the problem. Minimize $d_1^2 + d_2^2 + d_3^2$ subject to $d_1 + d_2 + d_3 = k$, $k > 0$ and $d_1, d_2, d_3 \geq 0$. [12]

6. a) State and explain Richard E. Bellman principle of optimality in dynamic programming.

   b) A manufacturing organization has the requirements of 100, 200, 300, 300 & 200 items for the ensuing five periods. The procurement cost is Rs.12 per procurement irrespective of the size of the purchase. The holding cost is Rs.2 per 100 items per period. The maximum inventory is not to exceed 400 items at any period. Formulate a dynamic programming problem and find the policy of procurement so as to minimize the total cost. No inventory is to be left in the last season. Maximum quantity ordered is 600. [12]

7. a) What are the limitations of search techniques?

   b) Find minimum of $f(x) = x^2 - 2x$, $0 \leq x \leq 1.5$ within the interval of uncertainty 0.25 L_0 where L_0 is the original interval of uncertainty. [12]

8. Solve the following single variable optimization problem using the G.P. method
   Minimize $f(x) = x^3 - x$, $x > 0$. [12]

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