R13

Code No: 812AK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA II Semester Examinations, August - 2017
OPERATIONS RESEARCH

Time: 3 Hours   Max. Marks: 60

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 8 marks and may have a, b, c as sub questions.

PART - A

5×4 Marks = 20

1.a) What is the significance of the conditions of variables in LPP? [4]
 b) Explain how you get multiple solutions in assignment problems. [4]
 c) List out the assumptions made in solving sequencing problem. [4]
 d) Define a rectangular game and explain the approaches of solving it. [4]
 e) Explain various queue configurations. [4]

PART - B

5×8 Marks = 40

2. Use degeneracy principles to solve the following LPP:
   Maximize $Z = 3x_1 + 9x_2$
   Subject to $x_1 + 4x_2 \leq 8$
                $x_1 + 2x_2 \leq 4$
                $x_1, x_2 \geq 0$ [8]

OR

3. Sreeja & Co wishes to plan its advertising strategy. There are two media under consideration, Siti cable and Popular channel. Siti cable has a reach of 2000 potential customers and Popular channel has a reach of 3000 potential customers. The cost per appearance of one minute is Rs. 6000 and Rs. 9000 in Siti and Popular respectively. The budget of Sreeja is Rs. 80,000 per month. There is an important requirement that the total reach for the income group under Rs. 60,000 per annum should not exceed 3000 potential customers. The reach in Siti cable and Popular channel for this income group is 300 and 150 potential customers. How many appearances of one minute advertisements should Sreeja plan so as to maximise the total reach? Formulate the problem and solve it. [8]

4. A dealer stocks and sells four types of Bicycles namely Atlas, Bharath, Champion, Duncan which he may procure from three different suppliers namely Priyanshu, Qureshi and Raju. His anticipated sales for the bicycles for the coming seasons are 410, 680, 310 and 550 nos. respectively. He can obtain 900 bicycles from Priyansi 600 from Qureshi and 560 from Raju at suitable prices. The profit per bicycle in for each supplier is tabulated below

Type \ Supplier	Atlas	Bharath	Champion	Duncan
Priyanshu (P)	21.50	26.00	19.50	21.00
Qureshi (Q)	20.50	24.00	20.00	21.00
Raju (R)	18.00	19.50	19.00	19.50

Formulate the above information as transportation model and obtain initial solution by North West Corner Rule.　　　　　[8]

OR

5. Sai Nath Institute of Science and Technology (SNIST) is providing transport to its students in four routes. There are four parties made their bids as given below.

Party	Bids in routes (in '000 Rs/month)			
	Koti	Secunderabad	Mehdipatnam	Charminar
Pradeep travels	4	5	7	6
Raju & co	10	5	4	4
Harika Bus	3	6	2	5
Lavanya transport	6	4	4	5

The institute wishes to allocate one route to each party. The pradeep travels has offered a discount of 1000/- on additional route if they are allocated more than one routes. Find the optimal assignment to minimize their monthly costs. Also check whether the SNIST has to consider the offer given by pradeep Travels.　　[8]

6. A company has six jobs which go through 3 machines X,Y and Z in order XYZ. The processing time in minutes for each job on each machine is given as follows. Find the sequence that minimizes the total elapsed time required to complete the following tasks　　　　　[8]

		Jobs					
		1	2	3	4	5	6
	X	18	12	29	36	43	37
Machines	Y	7	12	11	2	6	12
	Z	19	12	23	47	28	36

OR

7. A computer has a large number of electronic tube, that are subject to mortality as given below:

Period	Age of failure	Probability of failure
1	0-100	0.10
2	101-200	0.26
3	201-300	0.35
4	301-400	0.22
5	401-300	0.07

If the tubes are group replaced, the cost of replacement is Rs. 15 per tube. Group replacement can be done at fixed intervals in the night shift when the computer is not normally used. Replacement of individuals tubes which fails in services costs Rs. 60 per tube. How frequently should the tubes be replaced?   [8]

8.a) What are the distinguishing features of the dynamic programming approach? How are they different from the other linear programming approaches?

  b) Distinguish between the following with reference to dynamic programming.[4+4]

OR

9. Solve the following game graphically.   [8]

-6	0	6	-3/2
7	-3	-8	2

10. The demand for an item is deterministic and constant over a time and it is equal to 600 units per year. The unit per cost of the item is Rs. 50 while the cost of placing an order is Rs. 5. The inventory carrying cost is 20% of the cost of inventory per annum and the cost of shortage is Re. 1 per unit per month. Find the optimal ordering quantity when stock outs are permitted. If the stock outs are not permitted, what would be the loss to the company?   [8]

OR

11. Customers arrive at a box office window being managed by a single individual according to a Poisson input process with mean rate of 30 per hour the time required to serve a customer has an exponential distribution with a mean of 90 seconds. Find the average waiting time of a customer. Also determine the average number of customers in the system and average queue length.   [8]

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