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Code No: 721CN

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MBA II Semester Examinations, April/May-2019
QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS

Time: 3hours **Max.Marks:75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A **5 × 5 Marks = 25**

1.a) What are the advantages and disadvantages of using Operations Research (OR) models in making business decisions? [5]
b) What are the advantages and limitations in LPP? [5]
c) Describe the basic steps of Hungarian method for solving an assignment problem. [5]
d) What are the main ingredients of decision problem under uncertainty? Explain with suitable examples. [5]
e) What is the typical structure of a waiting line system? [5]

PART - B **5 × 10 Marks = 50**

2. What is a model? Why do we have to create a model in the process of decision making? [10]

OR

3. For most product (except essential commodities), higher prices result in decreased demand and vice versa. Let
d = annual demand for a product in units
p = price per unit
Assuming that a firm estimates the following price – demand relationship:
d = 800 – 10 p, where p must be between Rs 20 and Rs 70.
Show the mathematical model for the total revenue, which is the annual demand multiplied by the unit price. How many units the firm can sell at Rs 50 per unit price? If the price options are Rs 30, Rs 40 and Rs 50 per unit only, at what price the total revenue will be maximum? [10]

4. Given the LP as
Max 2A + 3B
Such that,
$1A + 3B \geq 90$
$5A + 5B \leq 400$
$-1A + 1B \leq 10$
$A, B \geq 0$
Solve the above problem graphically, mark the feasible region and explain the optimal solution. [10]

OR

5. For the transportation problem given by the following tableau, find an initial basic feasible solution by the North-West corner method and then find an optimal solution. [10]

	D	E	F	Supply
A	9	15	12	10
B	6	8	13	23
C	9	3	11	30
Demand	21	14	25	

6. Use the Simplex method to find the maximum value of:
$Z=2x_1- x_2+2x_3$
Subjected to constraints
$2 x_1+ x_2\leq10$
$x_1+2x_2 -2x_3\leq20$
$x_2+2 x_3\leq5$
Where
$x_1\geq0$
$x_2\geq0$ and $x_3\geq0$. [10]

OR

7. Four persons A, B, C and D are to be assigned four jobs I, II, III and IV. The cost matrix is given as under, find the proper assignment. [10]

Man / Jobs	*A*	*B*	*C*	*D*
I	8	10	17	9
II	3	8	5	6
III	10	12	11	9
IV	6	13	9	7

8. In the context of decision making under uncertainty, explain with suitable examples as to how to assess the expected value of perfect information and how to use this expected value. [10]

OR

9. A company is trying to decide whether to bid for a certain contract or not. They estimate that merely preparing the bid will cost £10,000. If their company bid, then they estimate that there is a 50% chance that their bid will be put on the "short-list", otherwise their bid will be rejected.
Once "short-listed" the company will have to supply further detailed information (entailing costs estimated at £5,000). After this stage their bid will either be accepted or rejected.
The company estimates that the labor and material costs associated with the contract are £127,000. They are considering three possible bid prices, namely £155,000, £170,000 and £190,000. They estimate that the probability of these bids being accepted (once they have been short-listed) is 0.90, 0.75 and 0.35 respectively.
What should the company do and what is the expected monetary value of your suggested course of action? [10]

10. Give one example of each of the following:
a) Single server with finite population
b) Single server with infinite population
c) Multiple server with finite population
d) Multiple server with infinite population [10]

OR

11. Go-Bust International Bank operates a drive-up teller counter that allows customers to complete bank transactions without getting out of their cars. On week day mornings, arrivals to the drive-up teller occurs at random, with the arrival rate of 24 customers per hour. Assuming an exponential probability distribution with a service rate of 36 customers per hour, please calculate the following:
a) The average number of customers waiting in the system
b) The average time a customer spends in waiting
c) The average time a customer spends in the system
d) The probability that arriving customers will have to wait for service. [10]

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