Code No: 721CN

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MBA II Semester Examinations, July/August - 2021
QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS

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

Answer any five questions
All questions carry equal marks
- - -

1.a) Explain in detail the scope of Operations research (OR).
b) Point out the limitations of Operations Research. [8+7]

2.a) Define a model and explain the various types of models used in OR.
b) Discuss the management applications of OR. [8+7]

3. Solve the following Linear programming problem by applying the principle of duality:
Max. $z = 3x_1 - 2x_2$, subject to the constraints:
$x_1 + x_2 \leq 5$, $x_1 \leq 4$, $1 \leq x_2 \leq 6$, and $x_1, x_2 \geq 0$. [15]

4. Five salesmen are required to be assigned to five cities. Having regard to their past performance, the following table provides the annual sales (in rupees lakhs) that can be generated by each salesman in each city. Find the optimal assignment.

	City				
Salesmen	Ahmedabd	Bangalore	Cochin	Delhi	Chennai
S1	26	14	10	12	9
S2	31	27	30	14	16
S3	15	18	16	25	30
S4	17	12	21	30	25
S5	20	19	25	16	10

[15]

5. An engineering firm has installed a machine costing Rs.4 lacks and is in the process of deciding on an appropriate number of certain spare parts required for repairs. The spare parts cost Rs.4,000 each but are available only if they are ordered now. In case the machine fails and no spares are available, the cost to the company of mending the plant would be Rs.18,000. The plant has an estimated life experience with similar machines as follows:

No. of failures during 8 yearly period	0	1	2	3	4	5	6
Probability	0.1	0.2	0.3	0.2	0.1	0.1	0

Ignoring any discounting for time value of money, determine the following:
a) The optimal number of units of the spare part on the basis of
i) minimax principle ii) minimum principle
iii)Laplace principle and iv) expected cost principle.
b) The expected number of failures in the 8-year period.
c) The regret table and the optimum choice on the basis of least expected regret criterion.
d) EVPI. [4+4+4+3]

6. A businessman has two independent investments A and B available to him, but he lacks the capital to undertake both of them simultaneously. He can choose to take A first and then stop, or if A is successful then take B, or vice-versa. The probability of success of A is 0.07 while for B it is 0.40. Both investments require an initial capital outlay of Rs.2, 000 and both return nothing if the venture is unsuccessful. Successful completion of A will return Rs.3, 000 (over cost) and successful completion of B will return Rs.15, 000 (over cost). Draw the decision tree and determine the best strategy. [15]

7. A company dealing in consumer goods distributes its products by trucks loaded at its only loading station. Both, company's trucks and contractor's trucks are used for this purpose. It was found that on an average every five minutes, one truck arrived and the average loading time was three minutes. 50% of the trucks belong to the contractor. Find out
a) The probability that a truck has to wait.
b) The waiting time of truck that waits
c) The expected waiting time of contractor's trucks per day, assuming a 24-hour shift. [5+5+5]

8. What is a queuing problem? What is queue discipline? What are the applications of queuing theory in business? Give examples. [15]

--ooOoo--