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Code No: 742AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MBA II Semester Examinations, December - 2018
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) How do Operations Research methods help executives take better business decisions? [5]
b) What is degeneracy and cycling in linear programming? How does one resolve this? [5]
c) How does transportation problem differ from assignment problem? [5]
d) If a company has several independent investment opportunities, each of which has an equal chance of gaining Rs.1,00,000 or losing Rs.60,000. What is the probability that the company will lose money in two such investments and in three investments? [5]
e) Player A paid Rs.8 if two coins turn both heads and Rs.10 if two coins turn both tails. Player B is paid Rs. 3 when two coins do not match. Given the choice of being A or B which one would you choose and what would be your strategy? [5]

PART - B **5 × 10 Marks = 50**

2.a) What are the opportunities and shortcomings of operations research approach?
b) What is mathematical model? What is its relevance in OR? [5+5]

OR

3.a) What is the scope for application of OR in production, inventory management and distribution?
b) How do you test and validate a model? [5+5]

4. A company produces two types of pens A and B. Pen A is of superior quality and pen B of inferior quality. Profit on pen A and pen B are Rs.5 and Rs.3 per pen respectively. Raw material required for each pen A is twice as that of pen B. The supply of raw material is sufficient only for 1000 pens of B per day. Pen A requires a special clip and only 400 clips are available per day. For pen B only 700 clips are available per day. Find graphically the product mix so that the company can make maximum profit. [10]

OR

5. A firm manufacturing a single product has three plants I, II and III. They have produced 60,35 and 40 units respectively during this month. The firm had made a 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 shifting the manufactured product to the five customers. The net unit cost of transporting from the three plants to the five customers is given below: [10]

Customers →

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

6. Casualty Medical Officer in a hospital has received four requests for Ambulance van facility. Currently, six vans are available for assignment and the estimated response time in minutes are shown in the table below:

Incidents ↓	Van 1	Van2	Van3	Van4	Van5	Van6
I	16	15	13	14	15	18
II	18	16	12	13	17	16
III	14	14	17	16	15	15
IV	13	17	19	18	14	17

Determine which van should respond, and what will the average response time. [10]

OR

7. A travelling salesman has to visit 5 cities. He wishes to start from a particular city, visit each city once and then return to his starting point. The travelling cost in (Rs.'000) of each city from a particular city is given below:

To city →

From ↓	A	B	C	D	E
A	--	2	5	7	1
B	6	--	3	8	2
C	8	7	--	4	7
D	12	4	6	--	5
E	1	3	2	8	--

What is the sequence of visit of the salesman so that the cost is minimized? [10]

8. Ramana often flies from Chennai to Hyderabad. He can use the airport bus which cost Rs.250 but if he takes it, there is a 0.08 chance he will miss the flight. The stay in a hotel costs Rs.2700 with a 0.96 chance of being on time for the flight. For Rs.3500 he can use a taxi which will make 99 percent chance of being on time for the flight. If Ramana catches the plane on time, he will conclude a business transaction which will produce a profit of Rs.100,000. Otherwise he will lose it. Which mode of transport should Ramana use? Answer on the basis of EMV criterion. [10]

OR

9. The required data for a small project consisting of different activities are given below:

Activity	Predecessor activity	Normal duration in days	Normal cost in Rs.	Crash duration in days	Crash cost in Rs.
A	--	6	300	5	400
B	--	8	400	6	600
C	A	7	400	5	600
D	B	12	1000	4	1400
E	C	8	800	8	800
F	B	7	400	6	500
G	D,E	5	1000	3	1400
H	F	8	500	5	700

a) Draw the network and find out the normal project length and minimum project length.
b) If the project is to be completed in 21 days with minimum crash cost which activities should be crashed to how many days? [10]

10. In a railway marshalling yard, goods train arrive a rate of 30 trains per day. Assuming that the inter-arrival time follows an exponential distribution and the service time (the time taken to hump the train) distribution is also exponential with an average of 36 minutes. Calculate,
a) Expected queue size.
b) Probability that queue size exceeds 10.
c) If the input of trains increases to an average of 33 per day, what will be the change in a and b. [10]

OR

11. Two firms F1 and F2 make colour and black and white television sets. F1 can make either 300 colour sets in a month or an equal number of black and white sets, and make a profit of Rs, 2000 per colour sets and 1500 per black and white set. F2 can on the other hand, make either 600 colour sets or 300 colour and 300 black & white sets or 600 black and white sets per month. It also has the same profit margin on the two sets as F1. Each month there is a market of 300 colour sets and 600 black and white sets and the manufacturers would share market in the proportion in which they manufacture a particular type of sets.
Write the payoff matrix of F1 and F2 per month. Obtain F1 and F2's optimal strategies and the value of the game. [10]

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