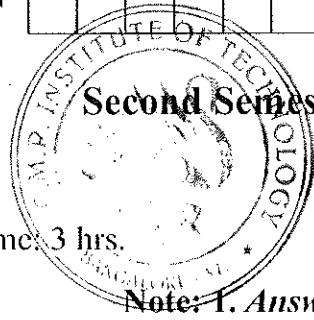


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Second Semester MBA Degree Examination, June/July 2016
Quantitative Methods – II

Time: 3 hrs.

Max. Marks: 100

- Note:** 1. Answer any **THREE** full questions from Q.No.1 to Q.No.6.
 2. Question No. 7 and Q No. 8 is compulsory.

- 1 a. What is saddle point in Game theory? (03 Marks)
 b. Briefly explain the scope and applications of operation research. (07 Marks)
 c. Solve the following LPP by graphical method.

$$\text{Max } Z = 40x_1 + 35x_2$$
 Subjected to $2x_1 + 3x_2 \leq 60$
 $4x_1 + 3x_2 \leq 96$
 $x_1 \geq 0$ and $x_2 \geq 0$ (10 Marks)

- 2 a. What is degeneracy in transportation problem? (03 Marks)
 A company produces 30 cars per day. The probability of daily sales quantity is given below:
- | | | | | | | |
|---------------|------|------|------|------|------|------|
| Sales (units) | 27 | 28 | 29 | 30 | 31 | 32 |
| Probability | 0.10 | 0.15 | 0.20 | 0.35 | 0.15 | 0.05 |
- b. Simulate to next 10 days using the following random number and find how many days company loses opportunity of selling cars. Random Nos : 5, 95, 18, 63, 35, 84, 7, 54, 28, 14. (07 Marks)
 c. A self service store employs six cashier at its customer. Every 5 minutes 9 customers arrive at an average, while the cashier can serve 10 customers in 5 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service rate, find
 i) Average number of customer in the system.
 ii) Average number of customer in the Q.
 iii) Average waiting time the customer spends in the system.
 iv) Average time the customer wait before being served. (10 Marks)

- 3 a. What are the 3 basic elements of the general structure of LP model. (03 Marks)
 b. Discuss briefly about Decision trees. (07 Marks)
 c. A small project consisting of the following Jobs where time estimate are given below:
- | | | | | | | | | | | |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| JOB | 1-2 | 1-3 | 2-3 | 2-5 | 3-4 | 3-6 | 4-5 | 4-6 | 5-6 | 6-7 |
| Time (Days) | 15 | 15 | 3 | 5 | 8 | 12 | 1 | 14 | 3 | 14 |
- i) Draw a network diagram
 ii) Find float for each activity
 iii) Find critical path and project duration. (10 Marks)

- 4 a. List the composition of sequencing problem. (03 Marks)
 b. A company produces 2 types of leather belts A and B. profits on the 2 types of belts are Rs 40/- and Rs 30/- per belt respectively. Each belt of type A requires twice as much time as required by belt B. If all belts are type B, the company could produce 1000 belts a day. The supply of leather is sufficient only for 800 belt per day. Belt A requires a fancy buckle and only 400 buckles are available per day. Belt B can be produced only to a maximum of 700 per day. How should the company manufacture 2 types of belts in order to maximize profit. Formulate LPP? (07 Marks)

- c. Reduce the following game by dominance and find the game value

		Player 2			
		1	2	3	4
Player 1	1	6	2	4	8
	2	2	-1	1	12
	3	2	3	3	9
	4	5	2	6	10

(10 Marks)

- 5 a. Give the main characteristic of operation Research. (03 Marks)
 b. A car service centre undertake tinkering and painting of damaged cars. It has one tinkering shop and one painting shop. Presently there are 5 cars. Time estimated for each car is given below :

Cars/work centre	1	2	3	4	5
Tinkering m/c	5	3	8	7	6
Painting m/c	4	9	2	5	10

Find the sequences that minimize the total elapsed time. (07 Marks)

- c. A project consists of 4 major jobs for which 4 contractors have submitted tenders. The tender amounts are as follows. Find the assignment, which minimize the total cost of project.

		Projects			
		A	B	C	D
Contractor	1	10	24	30	15
	2	16	22	28	12
	3	12	20	30	10
	4	9	26	34	16

(10 Marks)

- 6 a. Give any 3 advantages of simulation. (03 Marks)
 b. Briefly discuss about Decision under Risk and uncertainty (07 Marks)
 c. Solve the game graphically and find the value.

		Player B			
		2	2	3	-1
Player A	4	3	2	6	

(10 Marks)

- 7 a. Draw the network diagram for the following:

Activity	A	B	C	D	E	F	G	H	I
Predecessor	-	-	B	B	A	A	F	C, G, E	F

(05 Marks)

- b. IN a toy manufactures company, suppose the product acceptance probability are not known, but the following data is known :

Product Acceptance	Anticipated 1 st year profit (000's) product line		
	Full	Partial	Minimal
Good	8	70	50
Fair	50	45	40
Poor	-25	-10	0

Determine the optimal Decision under each of the following decision criterion and show how you arrived at it.

- i) maxmix ii) maxmin iii) equal likelihood. (05 Marks)

- c. Two players A and B without seeing each other put a coin on table, with head or tail up. 'A' wins Rs 8/- when both coin shown head and Rs 1/- when both are tail 'B' wins Rs 3/- when the coin do not match. Giving the choice of being matching player A or non matching player B, which one would you choose and what would be your choice. (05 Marks)
- d. Find the initial basic feasible solution using least cost method for the following transportation problem.

Destination

		A	B	C	D	Supply
Source	1	3	1	7	4	300
	2	2	6	5	9	400
	3	8	3	3	2	500
Demand		250	350	400	200	

(05 Marks)

- 8 a. The following table shows the jobs of a network along with their time estimates :

Job	1-2	1-6	2-3	2-4	3-5	4-5	6-7	5-8	7-8
To	1	2	2	2	7	5	5	3	8
t_m	7	5	14	5	10	5	8	3	17
t_p	13	14	26	8	19	17	29	9	32

Draw the project network and find the probability of the project completes in 40 days.

(use normal distribution table $z(0.8) = 0.2881$)

(10 Marks)

- b. Solve the following transportation problem. Determine basic Feasible by VAM and optimal solution by MODI method.

Origin		Destination				Supply
		D ₁	D ₂	D ₃	D ₄	
Origin	01	6	1	9	3	70
	02	11	5	2	8	55
	03	10	12	4	7	70
Demand		85	35	50	45	

(10 Marks)
