

**VPM's**  
**DR VN BRIMS, Thane**  
**Programme: PGDM (2015-17)**  
**Second Trimester Examination Jan- Feb 2016**

<b>Subject</b>	<b>Quantitative Techniques-II</b>		
<b>Roll No.</b>		<b>Marks</b>	<b>60 Marks</b>
<b>Total No. of Questions</b>	<b>7</b>	<b>Duration</b>	<b>3 Hours</b>
<b>Total No. of printed pages</b>		<b>Date</b>	

**Note: Q1 is compulsory and solve any FOUR from the remaining SIX questions.**

**Q1) 20 Marks (Compulsory)**

- a) Solve the following game. Find the optimal strategy for player A and find the value of the game.

		Player B		
		b1	b2	b3
Player A	a1	4	1	0
	a2	3	2	-1
	a3	-1	4	3

- b) A company manufactures certain products and requires a part M for the same. M is produced in-house in the company in a job-shop at the rate of 60 items / day. The annual requirement of M by the assembly line is 9300 items. The setup cost of the job shop is Rs. 2,000 per setup. Assume 300 working days in a year. The holding cost per unit is Rs. 18 per annum. The cost per unit of the item is Rs. 12. What is the economic order quantity and the total cost?

**Attempt Any FOUR from the Remaining SIX Questions. Each question carries 10 marks.**

- Q2) The owner of a ready-made garments store sells two types of premium toys, known as Star toys and Sky toys. He makes a profit of Rs 200 and Rs 300 per toy on Star and Sky shirts, respectively. He has two workers, A and B who make the toys. Worker A can devote a total of 14 hours per day, while worker B can give at the most 12 hours a day. Both types of toys are worked on by both the tailors. The time needed for stitching a Star toy is 2 hours by worker A and 3 hours by worker B. Similarly, a Sky toy requires 4 hours by worker A and 3 hours by worker B. How many toys of each type should be made in order to maximize daily profit? Formulate it as a linear programming problem and solve using graphical method.

- Q3) The times taken by 7 jobs on 3 machines are as follows. Find the optimal assignment so that the time is minimized and find the idle time on machine 3.

	1	2	3	4	5	6	7
Machine A	42	56	48	59	25	46	25
Machine B	15	14	18	12	18	21	20
Machine	48	25	15	45	49	56	23

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- Q4)** A company has three factories F1, F2, F3 with production capacities of 7, 10 and 18 units (in thousands). It has four warehouses W1,W2,W3 and W4 with demands of 5, 8, 7 and 15 units (in thousands). Find the optimal allocation which minimizes the cost of transportation. Unit cost of transportation is given from each factory to each warehouse.

To/From	W1	W2	W3	W4
F1	38	60	100	24
F2	140	60	80	120
F3	80	20	120	40

- Q5)** A bookseller sells a particular book on general knowledge for Rs. 120 per unit. He purchases the book for Rs. 90 per unit. The monthly demand for the books is expected to be from 12 books to 16 books. Any book unsold by the end of the month needs to be thrown away and cannot be used for the next month. The probability that the books will be bought is as follows.

Demand	12	13	14	15	16
Probability	0.1	0.2	0.4	0.1	0.2

Find the number of books to be bought by the bookseller using the principles of Maximin, Maximax, Huriwicz ( $\alpha = 0.6$ ), Laplace, Maximum likelihood, and expected payoff.

- Q6)** The times taken (in minutes) by 5 workers A, B, C, D and E to perform 5 tasks are as given in the table. Assign the workers in such a way that minimizes the time.

	1	2	3	4	5
A	81	14	36	40	31
B	20	31	25	26	81
C	30	87	19	70	65
D	23	56	60	18	45
E	12	15	18	21	100

- Q7)** What are the different costs associated with inventory? For the following company, find the economic order quantity and the safety stock. Assume 300 working days in a year.

Annual Demand (D) = 3,300 units  
 Ordering Cost (S) = Rs. 150 per order  
 Holding Cost (H) = Rs. 11 per unit per annum  
 Lead Time (L) = 4 days