MBA 09

M.B.A. DEGREE EXAMINATION, JUNE 2007

Second Semester

Common for HRM/Marketing/Finance/International Business

Paper IX — QUANTITATIVE TECHNIQUES FOR MANAGERS

Time : Three hours Maximum : 100 marks

SECTION A — ($5 \times 6 = 30$ marks)

Answer any FIVE questions.

1. What are the limitations of operations research?

2. Explain the important terms of an LPP.

3. Obtain the initial basic feasible solution to the following using Least cost method.

		To				
		D	E	F	G	
From	A	11	13	17	14	250
	B	16	18	14	10	300
	C	21	24	13	10	400
		200	225	275	250	

4. Explain the Hungarian method to solve an assignment problem.

5. Write Prim's algorithm.

6. Explain the terminologies of Game theory.

7. What is Goal programming? Why we need goal programming.

8. Explain M/M/I model.

SECTION B — ($5 \times 10 = 50$ marks)

Answer any FIVE questions.

9. Solve graphically :

Max. $z = 7x + 5y$

Subject to $x + 2y \leq 6$

$4x + 3y \leq 12$

$x, y \geq 0$.

10. Use simplex method to solve

Max. $z = 6x_1 + 8x_2$

Subject to $5x_1 + 10x_2 \leq 60$

$4x_1 + 4x_2 \leq 40$

$x_1, x_2 \geq 0$.

(2, 4)	2	5	8
(3, 5)	5	11	17
(4, 5)	3	6	15
(6, 7)	3	9	27
(5, 8)	1	4	7
(7, 8)	4	19	28

(a) Draw the project network

(b) Calculate the length and variance of the critical path.

14. Use the dominance property to simplify the rectangular game and solve it graphically

		Player B			
		I	II	III	IV
Player A	1	18	4	6	4
	2	6	2	13	7
	3	11	5	17	3
	4	7	6	12	2

15. At a central warehouse, vehicles arrive at the rate of 18 per hour and the arrival rate follows Poisson distribution. The unloading time of the vehicles follows exponential distribution and the unloading rate is 6 vehicles per hour. There are 4 unloading crews. Find the following

(a) P_0 and P_3

(b) L_q, L_s, w_q and W_s

16. Explain the determination of economic life of an asset.

SECTION C — ($1 \times 20 = 20$ marks)

17. A company produces two kinds of products X and Y production of either X or Y requires 2 hours of production capacity in the plant. The plant has a maximum production capacity of 20 hours per week. The overtime hour should not exceed 4 hours 1 week. The plant manager has set the following goals arranged in the order of importance.

(a) to avoid any under utilization of production capacity

(b) to limit the overtime hours to 4 hours

(c) to minimize the overtime operation of the plant as much as possible

Formulate this as a goal programming problem and then solve it by simplex method.

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11. Solve the following transportation problem :

				Supply
S_1	2	7	4	5
S_2	3	3	7	8
S_3	5	4	1	7
S_4	1	6	2	14
Demand	7	9	18	

12. Ram Industry needs 5400 units/year of a bought – out component which will be used in its main product. The ordering cost is Rs. 250 per order and the carrying cost per unit per year is Rs. 30. Find the economic order quantity, the number of orders per year and the time between successive orders.

13. The following table lists the jobs of the network with their time estimates

Job $i-j$	Duration		
	Optimistic	Most likely	Pessimistic
(1, 2)	3	6	15
(1, 6)	2	5	14
(2, 3)	6	12	30