

Register Number: .....

**MBA DEGREE EXAMINATIONS: JULY 2013**

First Semester

**MASTER OF BUSINESS ADMINISTRATION**

MBA617: Decision Models for Management

**Time: Three Hours**

**Maximum Marks: 100**

**Case Study:-**

**PART A (1 x 20 = 20 Marks)**

1. A furniture manufacturing company plans to make two products-chairs and tables-from its available resources, which consists of 400 board feet of mahogany timber and 450 man-hours of labour. It knows that to make a chair requires 5 board feet and 10 man-hours and yields a profit of Rs. 45, while each table uses 20 board feet and 15 man-hours and has a profit of Rs. 80. The problem is to determine how many chairs and tables the company can make keeping within its resource constraints, so that it maximizes the profit. Using simplex method.

**Answer all the Questions:-**

**PART B (10 x 2 = 20 Marks)**

2. What are the limitations of a LPP?
3. Define slack and surplus variables in LPP.
4. Define an Assignment problem.
5. What is two person zero sum game?
6. Give three examples of sequencing problem from your daily life.
7. What is no passing rule in a sequencing problem?
8. What do you understand by present worth factor?
9. What is group replacement policy?
10. Define traffic intensity.
11. What are the alternative criteria for decision under uncertainty?

**PART C (4 x 15 = 60 Marks)**

12. a) The perfect manufacturing company has a current transportation schedule which is being questioned by the top management as to whether or not it is optimal. The firm has three factories and five warehouses. The necessary data in terms of unit transportation costs (in Rs.), factory capacities and warehouse requirements are given below. Find the optimal schedule.

Warehouse	Factories			Warehouse requirements
	A	B	C	
1	50	40	80	400
2	80	70	40	400
3	60	70	60	500
4	60	60	60	400
5	30	50	40	800
Factory availability	800	600	1100	2500

(OR)

b) Solve the following game:

		Player B					
		I	II	III	IV	V	VI
Player A	A1	4	2	0	2	1	1
	A2	4	3	1	3	2	2
	A3	4	3	7	-5	1	2
	A4	4	3	4	-1	2	2
	A5	4	3	3	-2	2	2

13. a) Determine the optimal sequence of jobs which minimizes the total elapsed time based on the following information.

Processing times on the machines A, B, C			
Job	A	B	C
1	3	3	5
2	8	4	8
3	7	2	10
4	5	1	7
5	2	5	6

(OR)

- 13 b) Find the optimal sequence for processing 4 jobs A, B,C,D on four Machines A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub>, A<sub>4</sub>. Processing times are as given below.

	Processing times in hours			
Job/Machine	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>
A	15	5	4	14
B	12	2	10	12
C	13	3	6	15
D	16	0	3	19

14. a) (i) A machine owner finds from his past records that the costs per year of maintaining a machine whose purchase price is Rs.6100 are given below: (8)

Year	1	2	3	4	5	6	7	8
Maintenance cost(Rs.)	1000	1200	1400	1800	2400	2900	3400	4000
Resale Price	3000	1500	750	375	250	200	200	200

Determine at what age is a replacement due?

- (ii) A firm pays Rs. 10,000/- for its automobiles. Their operating and maintenance costs are about Rs.2,500/- per year for the first two years and then go up by approx. Rs.1500/- per year. When should such cars be replaced? The discount rate is 0.9 (7)

**(OR)**

- b) A computer contains 10,000 resistors. When any one of the resistor fails, it is replaced. The cost of replacing a single resistor is Rs. 10 only. If all the resistors are replaced at the same time, the cost per resistor would be reduced to Rs. 3.50. The percent of surviving by the end of month t is as follows:

Month(t)	0	1	2	3	4	5	6
% surviving by the end of month:	100	97	90	70	30	15	0

What is the optimum plan?

15. a) (i) Explain various queue disciplines. (5)
- (ii) On an average 96 patients per 24 hours day required the service of an emergency clinic. Also on average, a patient requires 10 minutes of active attention. Assume that the facility can handle only one emergency at a time. Suppose that costs the clinic Rs.100 per patient treated to obtain an average servicing time of 10 minutes, and that each minute of decrease in this average time would cost Rs.10 per patient treated, how much would have to be budgeted by the clinic to decrease the average size of the queue from  $1\frac{1}{3}$  patients to  $\frac{1}{2}$  patient? (10)

**(OR)**

- b) A businessman has three alternatives open to him and each which can be followed by any of the four possible events. The conditional pay-offs for each action event combination are given below:

Action	Pay-offs conditional on events			
	A	B	C	D
S <sub>1</sub>	8	0	-10	6
S <sub>2</sub>	-4	12	18	-2
S <sub>3</sub>	14	6	0	8

- (i) If he adopts maximin criterion, what acts he should choose?
- (ii) If the criterion of choice is minimax regret, what action should be chosen?
- (iii) If he adopts maximax criterion, what acts he should choose?
- (iv) If he uses EMV as his decision criterion, what action should he choose(assume that all events have equal probability of occurrence)?

\*\*\*\*\*