



MBA DEGREE EXAMINATIONS:JUNE 2015

(Regulation 2014)

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. Amar company is currently working with a process which after paying for materials, labour, etc., brings a profit of Rs.12,000. The following alternatives are made available to the company:
 - (i) The company can conduct research (R_1) which is expected to cost Rs.10,000 having 90% chances of success. If it proves a success, the company gets a gross income of Rs.25,000.
 - (ii) The company can conduct research (R_2) which is expected to cost Rs.8,000 having a probability of 60% success, the gross income will be Rs. 25,000.
 - (iii)The company can pay Rs. 6,000 as royalty for a new process which will bring a gross income of Rs.20,000.
 - (iv)The company continues the current process.

Because of limited resources, it is assumed that any one of the two types of research can be carried out at a time. Use decision tree analysis to locate the optimal strategy for the company.

Answer all the Questions:-

PART B (10 x 2 = 20 Marks)

2. State the limitations of the graphical method of solving a L.P.P.
3. Which method is used to evaluate the effect on an optimal solution of any LP problem due to changes in the objective function?
4. Say True or False: An assignment problem is a special case of a transportation problem. Justify.
5. Define saddle point. Is it necessary that a game should always possess a saddle point?
6. Give an example of a sequencing model.
7. What is no passing rule in a sequencing problem?
8. What is group replacement? Give an example.

9. State the different types of failure in replacement models.
10. Define traffic intensity.
11. Indicate the difference between decision under risk and decision under uncertainty in decision theory.

PART C (4 x 15 = 60 Marks)

12. a) A company produces two types of Hats. Each hat of the first type requires twice as much labour time as the second type. If all hats are of the second type only, the company can produce a total of 500 hats a day. The market limits daily sales of the first and second type to 150 and 250 hats. Assuming that the profits per hat are Rs.8 for type A and Rs. 5 for type B, formulate the problem as linear programming model in order to determine the number of hats to be produced of each type so as to maximize the profit, using graphical method.

(OR)

- b) An advertising agency wishes to reach two types of audiences: Customers with annual income greater than Rs. 15,000(target audience A) and customers with annual income less than Rs.15,000 (target audience B). The total advertising budget is Rs.2,00,000. One programme of TV advertising costs Rs.50,000; one programme on radio advertising costs Rs 20,000. For contract reasons, at least three programmes ought to be on TV and the number of radio programmes must be limited to five. Surveys indicate that a single TV programme reaches 4,50,000 customers in target audience A and 50,000 in target audience B. One radio programme reaches 20,000 in target audience A and 80,000 in target audience B. Determine the media mix to maximize the total reach.

13. a) Solve the following transportation problem whose cost matrix is given below. Use VAM method to find the initial solution.

		Destinations				Capacity
		A	B	C	D	
O R I G I N	1	15	10	17	18	2
	2	16	13	12	13	6
	3	12	17	20	11	7
	Demand	3	3	4	5	15

(OR)

13 b) Solve the following game:

Player A		I	II	III	IV
	A1	3	2	4	0
	A2	3	4	2	4
	A3	4	2	4	0
	A4	0	4	0	8

14. a) A readymade garments manufacturer has to process 7 items through two stages of production, i.e. cutting and sewing. The times taken for each of these items at the different stages are given below in appropriate units.

Item	: 1	2	3	4	5	6	7
Processing cutting time	: 5	7	3	4	6	7	12
Sewing	: 2	6	7	5	9	5	8

(i) Find an order in which these items are to be processed through these stages so as to minimize the total processing time, and also find the elapsed time for the two machines.

(ii) Suppose a third stage of production is added, say pressing and packing, with processing times as follows:

Processing time	: 10	12	11	13	12	10	11
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Find an order in which these seven items are to be processed so as to minimize the time taken to process all the items through all the three stages.

(OR)

b) Find the optimal sequence for processing 4 jobs A, B, C, D on four Machines A₁, A₂, A₃, A₄. Processing times are as given below.

	Processing times in hours			
Job/Machine	A ₁	A ₂	A ₃	A ₄
A	15	5	4	15
B	12	2	10	12
C	16	3	5	16
D	17	3	4	17

15. a) (i) A firm is considering replacement of a machine, whose cost price Rs.12,200 and (7)
the scrap value, Rs.200. The running costs in rupees are found from experience
to be as follows.

Year : 1 2 3 4 5 6 7 8

Running cost : 200 500 800 1200 1800 2500 3200 4000

When should the machine be replaced?

- (ii) A firm pays Rs. 10,000/- for its automobiles. Their operating and maintenance (8)
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.

(OR)

- b) A computer contains 1,000 resistors. When any one of the resistor fails, it is
replaced. The cost of replacing a single resistor is Rs. 1.25 only. If all the
resistors are replaced at the same time, the cost per resistor would be reduced to
30 paise. The percent of failure by the end of month t is as follows:

End of the Month(t)	1	2	3	4	5	6	7	8
Probability of failure to date	0.05	0.13	0.25	0.43	0.68	0.88	0.96	1.00

Determine the optimum policy to replace the resistors.
