

MBAC 2004

M.B.A. DEGREE EXAMINATION,
DECEMBER 2015/JANUARY 2016.

Second Semester

General

**OPERATIONS MANAGEMENT/OPERATIONS
RESEARCH AND MANAGEMENT**

Time : Three hours

Maximum : 100 marks

PART A — (5 × 6 = 30 marks)

Answer any FIVE questions out of Eight questions.

1. What are the different stages of development of Operations Research?
2. List out the limitations of operations research.
3. Solve the following problem graphically

Maximize $4x_1 + 4x_2$

Subject to: $-2x_1 + x_2 \leq 1$

$$x_1 \leq 2$$

$$x_1 + x_2 \leq 3$$

$$x_1, x_2 \geq 0.$$

4. Solve the assignment problem. The data given in the table refer to production in certain units:

Operators	Machines			
	A	B	C	D
1	10	5	7	8
2	11	4	9	10
3	8	4	9	7
4	7	5	6	4
5	8	9	7	5

5. State the basic Functions of inventory Management.

6. The usage of an inventory item each costing Re 1, is 10000 units/year and the ordering cost is Rs. 10, carrying charge is 20% based on the average inventory per year, stock out cost is Rs.5 per unit of shortage incurred. Determine EOQ, inventory level, shortage level, cycle period, number of order per year and the total cost.

7. What are the key concepts in the theory of Games?
 8. Examine whether the following game, is fair.

	Player Y			
Player X	6	-4	-3	-2
	3	5	0	8
	7	-2	-6	5

lawn, weeding gardens, and trimming shrubbery. Business became so good that Sneha hired two part-time workers to assist her and, even then, she believed she could expand further if she wanted to.

Questions:

(a) In what ways are Sneha's customers most likely to judge the quality of her lawn care services?

(b) Sneha is the operations manager of her business. Among her responsibilities are forecasting, inventory management, scheduling, quality assurance, and maintenance.

What kinds of things would likely require forecasts?

(c) What are some of the trade-offs that Sneha probably considered relative to expanding the business?

find employment elsewhere. Despite her efforts, after eight months of searching she was no closer to finding a job than the day she started. Her funds were being depleted and she was getting more discouraged. There was one bright spot, though: She was able to bring in a little money by mowing lawns for her neighbours. She got involved quite by chance when she heard one neighbour remark that now that his children were on their own, nobody was around to cut the grass. Almost jokingly, Sneha asked him how much he'd be willing to pay. Soon Sneha was mowing the lawns of five neighbors. Other neighbors wanted her to work on their lawns, but she didn't feel that she could spare any more time from her job search. However, as the rejection letters began to pile up, Sneha knew she had to make an important decision in her life. On a rainy Tuesday morning, she decided to go into business for herself taking care of neighbourhood lawns. She was relieved to give up the stress of job hunting, and she was excited about the prospects of being her own boss. But she was also fearful of being completely on her own. Nevertheless, Sneha was determined to make a go of it. At first, business was a little slow, but once people realized Sneha was available, many asked her to take care of their lawns. Some people were simply glad to turn the work over to her; others switched from professional lawn care services. By the end of her first year in business, Sneha knew she could earn a living this way. She also performed other services such as fertilizing

PART B — (5 × 10 = 50 marks)

Answer any FIVE questions out of Eight questions.

9. Highlight the history of operations Research.
10. Briefly explain the relationship between Manager and Operations Research Specialist.
11. Describe different techniques of OR.
12. Vehicles are passing through a toll gate at the rate of 70 per hour. The average time to pass through the gate is 45 seconds. The arrival rate and service rate follow poisson distribution. There is a complaint that the vehicles wait for a long duration. The authorities are willing to install one more gate to reduce the average time to pass through the toll gate to 35 seconds if the idle time of the toll gate is less than 9% and the average queue length at the gate is more than 8 vehicle, check whether the installation of the second gate is justified?
13. Tesota Bakery Ltd. produces two recipes A and B. Both recipes are made of two food stuffs I and II. Production of one Kg of A requires 7 units of food stuff I and 4 units of food stuff II whereas for producing one Kg of B, 4 units of food stuff I and 3 units of food stuff II are required. The company

has 145 units of food stuff I and 90 units of food stuff II. The profit per Kg of A is Rs. 120 while that of B is Rs. 90. The manager wants to earn a maximum profit of Rs. 2700 and to fulfil the demand of 12 Kgs of A. Formulate a goal programming problem for this situation

14. A factory produces three using three types of ingredients viz. X, Y and Z in different proportions. The following table shows the requirements of various ingredients as inputs per kg of the products.

Products	Ingredients		
	X	Y	Z
1	4	8	8
2	4	6	4
3	8	4	0

The three profits coefficients are 20, 20 and 30 respectively. The factory has 800 kg of ingredients X, 1800 kg of ingredients Y and 500 kg of ingredient Z. Determine the product mix which will maximize the profit and also find out maximum profit.

15. Find the optimum Solution of the following Problem using MODI method.

Source	Destination			Capacity
	1	2	3	
A	8	9	10	42
B	9	11	11	30
C	10	12	9	28
Demand	35	40	25	100

16. Explain the different factors affecting inventory management.

PART C — (1 × 20 = 20 marks)

Case study (Compulsory)

17. Sneha had worked for the same Fortune 500 Company for most 15 years. Although the company had gone through some tough times, things were starting to turn around. Customer orders were up, and quality and productivity had improved dramatically from what they had been only a few years earlier due company wide quality improvement program. So, it comes as a real shock to Sneha and about 400 of her co-workers when they were suddenly terminated following the new CEO's decision to downsize the company. After recovering from the initial shock, Sneha tried to