MBAC 2004

M.B.A. DEGREE EXAMINATION,
DECEMBER 2016/JANUARY 2017.

Second Semester

General

OPERATIONS RESEARCH AND MANAGEMENT /
OPERATION MANAGEMENT

Time : Three hours Maximum : 100 marks

PART A — ($5 \times 6 = 30$ marks)

Answer any FIVE questions.

1. Define Plant Layout. Explain the Principles of a good plant layout.
2. Describe the procedure for production planning.
3. State the Limitations of Operations Research.
4. Use the Simplex method to solve the following LPP problem.

   Maximize $z = X_1 + 2X_2$

   Subject to :

   $$-X_1 + 2X_2 <= 8,$$
   $$X_1 + 2X_2 <= 12,$$
   $$X_1 - X_2 <= 3;$$
   $$X_1 >= 0 \text{ and } X_2 >= 0$$

5. Solve the following transportation problem using north-west corner method :

	A1	A2	A3	A4	Supply
F1	19	30	50	10	7
F2	70	30	40	60	9
F3	40	8	70	20	18
Demand	5	8	7	14	34

6. Four jobs are to be done on four different machines. Assign the jobs so as to maximize the total profit :

	M1	M2	M3	M4
J1	15	11	13	15
J2	17	12	12	13
J3	14	15	10	14
J4	16	13	11	17

7. Draw the network diagram and determine the critical path for the following project :

Activity	Time estimate (Weeks)
1-2	5
1-3	6
1-4	3
2-5	5
3-6	7

(a) What is the probability that the cashier is idle?

(b) What is the average number of customer in the queuing system?

(c) What is the average time a customer spends in the system?

(d) What is the average time a customer in the queue?

Activity	Time estimate (Weeks)
3-7	10
4-7	4
5-8	2
6-8	5
7-9	6
8-9	4

8. The arrivals and services in a service center follow Poisson distribution. The arrival rate of the customer is 8 per hour, The service rate is 10 customers per hour. Find out the following :

   (a) The average number of the customer waiting for service.

   (b) The average time a customer has to wait in the queue.

   (c) The avenge time a customer has to be in the system.

PART B — (5 × 10 = 50 marks)

Answer any FIVE questions.

9. What are the types of layout?

10. Explain the factors considered in selecting plant location.

11. Enumerate the stages of operation research.

12. Use the graphical method to solve the following LPP problem :

Maximize $z = 15X_1 + 10X_2$

Subject to constraints

$$4X_1 + 6X_2 <= 360$$
$$3X_1 + 0X_2 <= 180$$
$$0X_1 + 5X_2 <= 200$$
$$X_1, X_2 >= 0.$$

13. Discuss the terms associated with Inventory Management.

14. Preethi Computers purchases 22,000 silicon chips every year and each unit cost Rs. 22/-, as they are Purchasing in bulk quantity such a low price is possible. Cost of each order is Rs. 350/-, Its inventory carrying cost is 18% of average inventory, What should be EOQ. What is the optimum number of day's supply for optimum order? What is the annual cost on Inventory including cost of the material?

15. Find out the time, variance and standard deviation of the project with the following time estimates in week :

Activity	Optimistic time estimate (to)	Most likely time estimate (tm)	Pessimistic time estimate (tp)
1-2	3	6	9
1-6	2	5	8
2-3	6	12	18
2-4	4	5	6
3-5	8	11	14
4-5	3	7	11
6-7	3	9	15
5-8	2	4	6
7-8	8	16	18

16. State the managerial applications of the theory of games.

PART C — (1 × 20 = 20 marks)

Compulsory

17. A departmental store has single cashier. During the rush hours, customers arrive at a rate of 20 customers per hour. The average number of customers that can be handled by the cashier is 24 per hour. Assume the conditions for use of the single – channel queuing model Apply.