

Roll No.

Total No. of Questions : 7

Total No. of Pages : 02

M.B.A. (Sem.-3rd)

APPLIED OPERATIONS RESEARCH

Subject Code : MB-301 (2008-10 Batch)

Paper ID : [C0197]

Time : 03 Hours

Maximum Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY.
2. Attempt any FOUR questions from SECTION-B.

SECTION-A (10 × 2 = 20 Marks)

1. Write a short note on :

- (a) What is the difference between slack, surplus and artificial variables?
- (b) What is degeneracy ? How does the problem of degeneracy arise in a transportation problem ?
- (c) Discuss the similarities in transportation and assignment models.
- (d) What is 'safety stock'? Why should it be kept by an organization ?
- (e) List the major weaknesses of EOQ model.
- (f) What are the basic characteristics of a queuing system ?
- (g) What is a dummy activity ? Why do we need dummy activities ?
- (h) What is the forward and backward pass ?
- (i) Describe the maximin and minimax principles of game theory.
- (j) What are the properties of a game?

SECTION-B (4 × 10 = 40 Marks)

2. A company makes two products (X and Y) using two machines (A and B). Each unit of X that is produced requires 50 minutes processing time on machine A and 30 minutes processing time on machine B. Each unit of Y that is produced requires 24 minutes processing time on machine A and 33 minutes processing time on machine B. At the start of the current week there are 30 units of X and 90 units of Y in stock. Available processing time on machine A is forecast to be 40 hours and on machine B is forecast to be 35 hours. The demand for X in the current week is forecast to be 75 units and for Y is forecast to be 95 units. Company policy is to maximize the combined sum of the units of X and the units of Y in stock

at the end of the week.

- Formulate the problem of deciding how much of each product to make in the current week as a linear program.
 - Solve this linear program graphically.
3. A company bottles and sells soft drinks by the case. It costs \$1100 to set up, and bottle a batch of drink. The annual cost to store the drink is \$2.75 per bottle. The annual demand for the drink is 16,000 bottles and the company has the capacity to produce 28,000 bottles annually. The current production policy is to continue producing the drink until the storage gets full. The storage holds a maximum of 750 bottles. The owners of the company are considering an option of increasing the storage space to hold a maximum of 3000 bottles as part of their expansion strategy for the next five years. Is this a good option in terms of the cost savings? Why or why not? Comment also on the current policy of producing the drink until the storage is full. What would be an optimal production policy for the brewery? Lastly, determine how many production days are required for the optimal production policy (assume one year = 365 days).
4. Solve the following transportation problem by finding initial basic feasible solution using Vogel's Approximation method.

	D1	D2	D3	D4	Supply
O1	21	16	15	3	11
O2	17	18	14	23	13
O3	32	27	18	41	19
Demand	6	10	12	15	43

5. What do you understand by queuing structure ? Explain (a) first-come-first-served (b) last-come first-served.
6. Draw the network diagram and determine various floats for the following project :

Activity	A	B	C	D	E	F
Predecessor	—	—	A	B	A	C,D
Duration	4	9	2	5	6	3

7. What are decision trees ? How and in what type of situations are they employed for decision making ?