

MANAGEMENT PROGRAMME

Term-End Examination

December, 2012

MS-51 : OPERATIONS RESEARCH

Time : 3 hours

*Maximum Marks : 100
(Weightage 70%)*

Note : Answer any four questions. All questions carry equal marks.

1. (a) Experts believe that OR is a technique which help in resolving conflicts between Production, Finance, Marketing and Personnel functions of a manufacturing unit. Do you agree ? Justify your answer with the help of suitable examples.

- (b) A company produces product A and B and has a total production capacity of 9 tons per day. A and B require the same production capacity. The company has a permanent contract to supply at - least 2 tons of A and at least 3 tons of B per day to another company. Each ton of A requires 20 machine hours production time and each ton of B requires 50 machine hours

production time. The daily maximum possible number of machine hours is 360. All the firm's out put can be sold and the profit made is Rs. 80 per tons of A and Rs. 120 per tons of B. Determine the production schedule for maximum profit and also calculate the profit.

2. (a) What functions does inventory perform ? State the two basic inventory decision management must make as they attempt to accomplish the function of inventory described by you.
- (b) A drug manufacturing company uses batch production process and uses material X for its famous brand of drug. Material X is being produced by the company in 10 batches of 1500 units each. All the material is being used in the production of the drug. The plant operates for 2800 hours in a year. The set up costs of the machine are Rs. 100/- and is independent of the batch size. The cost of the material is Rs. 200 per unit and holding cost is 20%. Is the existing production strategy adopted by the management economical ? Justify your answer.

3. (a) What do you understand by Simulation ?
Why is simulation used ? Give practical application of simulation technique.
- (b) Solve the following pay off matrix and determine the optimal strategies and the value of game.

$$A \begin{matrix} & \text{B} \\ \begin{matrix} \text{I} \\ \text{II} \end{matrix} & \begin{bmatrix} 1 & 1 \\ 3 & 4 \end{bmatrix} \end{matrix}$$

4. (a) What is a queue ? Give an example and explain the basic concept of queue. Also discuss the queue parameters.
- (b) A repair man is to be hired to repair machines which break down at an average rate of 3 per hour. The break down follows Poisson distribution. Non - productive time of a machine is considered to cost Rs. 10 per hour. Two repairmen have been interviewed - one is slow but cheap, while the other is fast but expensive. The slow repairman charges Rs. 5 per hour and he services break down machines at the rate 4 per hour. The fast repairman demand Rs. 7 per hour, and he services at an average rate of 6 per hour. Which repairman should be hired ?

5. (a) Explain in brief Gomory's method for solving an integer linear programming problem.
- (b) Four different jobs can be done on four different machines. The set up and take - down time are assumed to be prohibitively high for changeovers. The matrix below gives the cost in rupees of producing job i on machine j .

MACHINES

		M ₁	M ₂	M ₃	M ₄
JOBS	J ₁	5	7	11	6
	J ₂	8	5	9	6
	J ₃	4	7	10	7
	J ₄	10	4	8	3

Assign the Jobs to the various machines so that the total cost gets minimized.

6. Write short notes on *any four* of the following :
- (a) ABC Analysis
 - (b) Travelling Salesman Problem
 - (c) Dual of an LPP
 - (d) Bellman's Principle of Optimality
 - (e) Dynamic Programming