

603982

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MS-51

**MANAGEMENT PROGRAMME (MP)**

**Term-End Examination**

**June, 2019**

**MS-51 : OPERATIONS RESEARCH**

*Time : 3 Hours*

*Maximum Marks : 100*

*(Weightage 70%)*

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*Note : Attempt any four questions. All questions carry equal marks.*

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1. (a) What are the main characteristics of OR ?  
Explain with suitable examples. Discuss the scope and limitations of OR.
- (b) What do you understand by Simulation ?  
How is a simulation technique better than Mathematical models in solving problems of business and industry ? Discuss with suitable examples.

2. (a) "Goal programming appears to be the most appropriate, flexible and powerful technique for complex decision problems involving multiple conflicting objectives."  
Discuss.

(b) Discuss the application of dynamic programming in decision-making. How is this different from linear programming ?

3. (a) An appliance manufacturer produces two models of microwave ovens H and W. Both models require fabrication and assembly work : each H uses four hours of fabrication and two hours of assembly and each W uses two hours of fabrication and six hours of assembly. There are 600 fabrication hours available this week and 480 hours of assembly. Each H contributes ₹ 400 to profits, and each W contributes ₹ 300 to profits. What mix of H and W will maximize profits ?

- (b) Four factories (A, B, C, D) supply the requirements of three warehouses (E, F, G). The availability at the factories, the requirement of the warehouses and the various associated unit transportation costs are presented in the following table :

Factory	Warehouses			Available
	E	F	G	
A	10	8	9	15
B	5	2	3	20
C	6	7	4	30
D	7	6	8	35
Required	25	26	49	100

Find an initial basic solution of the transportation problem by Vogel's approximation method.

4. (a) An automobile dealer wishes to put four repairmen to four different jobs. The repairmen have somewhat different kinds of skills and they exhibit different levels of efficiency from one job to another. The dealer has estimated the number of man-hours that would be required for each job-man combination. This is given in matrix form in the following table :

		Jobs			
		A	B	C	D
Men	1	5	3	2	8
	2	7	9	2	6
	3	6	4	5	7
	4	5	7	7	8

Find the optimal assignment that will result in minimum man-hours needed.

- (b) A company has a monthly demand of 800 units of a product. The company can produce 8 products per hour when it starts a production run. It costs ₹ 3,000 for shop set-up to start a production run. The inventory carrying cost amounts to ₹ 1.50 per unit per month. What is the optimal batch size ? Assume 25 working days in a month and eight working hours in a day. How frequently should the production run be undertaken and what should be the length of each run ?
5. (a) Define the following terms :
- (i) Payoff matrix
  - (ii) Saddle point
  - (iii) Dominance
  - (iv) Pure strategy
  - (v) Two-person zero-sum game
- (b) Explain characteristics and classification of queuing models. Give some applications of queuing theory.

6. Write short notes on any *four* of the following :

- (a) ABC Analysis
- (b) Degeneracy in LP problem
- (c) Unbounded solution
- (d) Convex function
- (e) Travelling salesman problem
- (f) Bellman's principle of optimality