M.Sc. Information Technology 3rd Semester

(2123)

SYSTEMS APPROACH TO MANAGEMENT AND OPTIMIZATION TECHNIQUES

Paper—MS-14

Time Allowed : Three Hours]   [Maximum Marks : 80

Note :—Attempt **FIVE** questions in all, including Question-1 in Section-A, which is compulsory and taking **ONE** from each Section-B to Section-E.

SECTION-A (Compulsory Question)

1. (a) What is Operations Research (OR) ? What is the role of OR in decision making in an organization ?

   (b) How do manufacturing information management systems benefit business ?

   (c) Explain the various types of reports generated by Financial Information System.

   (d) Explain the concept of dynamic programming with suitable example.   4,4,4,4

SECTION-B

2. What is linear programming problem (LPP) ? Solve the following LPP with the help of Simplex method :

$$\max. z = 3x_1 + 4x_2 + x_3$$

$$\text{s.t.} \quad x_1 + x_2 + x_3 \leq 50$$

$$2x_1 - x_2 + x_3 \geq 15$$

$$x_1 + x_2 = 10$$

$$x_1, x_2, x_3 \geq 0 \qquad\qquad 16$$

3. Describe when the dual simplex method is appropriate for solving linear programming problem (LPP).

Solve the following LPP by using the dual simplex method. (Note that credit will not be given for a solution by any other method.)

$$\text{maximize } x_0 = -3x_1 - x_2 - x_3$$

subject to

$$-x_1 + 2x_2 + x_3 \geq 2$$

$$2x_1 - x_2 + x_3 \geq 5$$

$$x_1 + x_2 + 2x_3 \leq 12$$

$$x_1, x_2, x_3 \geq 0 \qquad\qquad 16$$

SECTION-C

4. Convert the following unbalanced transportation problem into a balanced one, find an initial feasible basis by the least costs first rule, and then solve the problem for optimal solution :

	Shop			Available
	A	B	C	
Factory D	56	130	64	110
Factory E	47	72	85	100
Factory F	141	93	108	80
Wanted	75	120	75	

16

5. Solve the following integer programming problem using Branch and Bound technique :

maximize $Z = X_2$

such that

$$15X_1 - 5X_2 \geq 21$$

$$6X_1 + 5X_2 \leq 27$$

$X_1, X_2 \geq 0$ and integer valued. 16

SECTION-D

6. Define the term "Management Information System (MIS)." Also, explain the statement with examples, "There is a two-ways relationship between organization and information system." 16

7. (a) Explain the use and importance of TALLY as accounting software.

(b) Enumerate the steps involved in the marketing research process and briefly discuss the importance of each of them.

8,8

SECTION-E

8. What is the Financial Information System (FIS) ? Describe the forecasting and funds management subsystems of FIS. 16

9. "In Human Resource Information Management, the Personal Manager has the responsibility of executing multifarious activities." Explain three types of such activities/sub-systems in light of the statement. 16