(i) **Printed Pages : 4**   Roll No. ....

(ii) **Questions** : 9

Sub. Code : | 3 | 6 | 2 | 1 |

Exam. Code : | 0 | 4 | 6 | 1 |

M.Sc. Information Technology 3rd Semester
(2122)
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 No. **1** in Section A, which is compulsory and taking **ONE** each from Section B to Section E. Marks are indicated on the right of various questions.

SECTION—A
(Compulsory Question)

1. (a) What is the role of knowledge based management system in the enterprise ? Explain.

   (b) What are the three principal levels within a business organization hierarchy ?

   (c) What is linear programming ? What are its major assumptions and characteristics ?

   (d) What is dynamic programming ? Explain with an example.

   4,4,4,4

SECTION—B

2. (a) What are the characteristics of Operations Research (OR) ? Discuss the role of computers in OR.

   (b) Give a brief outline of the Simplex method to solve a Linear Programming Problem. Solve the following LPP using Simplex Method :

   Maximize $z = 3x_1 + 5x_2 + 4x_3$

   subject to the constraints :

   $$2x_1 + 3x_2 \leq 8$$
   $$2x_2 + 5x_3 \leq 10$$
   $$3x_1 + 2x_2 + 4x_3 \leq 15$$
   $$x_1, x_2, x_3 \geq 0.$$

   8,8

SECTION—B

3. Consider the following primal problem :

   Maximize $z = 2x_1 + 6x_2 + 9x_3$

   subject to the constraints :

   $$x_1 + x_3 \leq 3 \text{ (resource 1)}$$
   $$x_2 + 2x_3 \leq 5 \text{ (resource 2)}$$

   and

   $$x_1 \geq 0, x_2 \geq 0, x_3 \geq 0.$$

   Construct the dual problem for this primal problem and solve the dual problem graphically. Use this solution to identify the shadow prices for the resources in the primal problem.

   16

SECTION—C

4. A company has a team of four salesmen and there are four districts where the company wants to start its business. The following is the profit per day in rupees for each salesman in each district :

Districts

Salesmen	D1	D2	D3	D4
A	16	10	14	11
B	14	11	15	15
C	15	15	13	12
D	13	12	14	15

Find the assignment of salesmen to various districts which will yield maximum profit. 16

5. State Travelling Salesman Problem (TSP). What problem do you envisage in finding solution to such problems by using usual Hungarian Assignment algorithm ? 16

SECTION—D

6. What activities convert raw data to make information in information systems ? What is their relationship to feedback ? List and describe four reasons why information systems are so important for business today. 16

7. Explain the reason as to why the role of the marketing manager has changed in recent times. What is the role of a marketing information system to an organization ? Describe the features and sub-systems of a marketing information system. 16

SECTION—E

8. What are Financial Information Systems ? What are its essential components ? How do they change the way an organization works ? 16

9. What is meant by Human Resource Information System (HRIS) ? Explain the need, objectives and benefits of HRIS. What are its various subsystems in the changing business environment of today ? 16