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M.Sc. IT 3rd Semester

1125

INFORMATION TECHNOLOGY

Paper : MS-14 : System Approach to Management and Optimization Techniques

Time Allowed : Three Hours] **[Maximum Marks : 80**

Note :– Attempt **five** questions in all, including Q.-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) How is decision support system different from management information system ?

   (b) What is the main difference between marketing intelligence and marketing research ?

   (c) What is meant by Industrial Engineering ?

   (d) How does Human Resources Information System (HRIS) help in managerial support ?

   (e) Explain the role of computers in Operations Research.

   (f) Define the purpose of sensitivity analysis in linear programming problem.

   (g) What is binary linear programming ? Explain with an example.

   (h) State Bellman's principle of optimality. 8×2=16

SECTION–B

2. (a) Define Operations Research. Give its characteristics and limitations.

   (b) What is Linear Programming Problem (LPP) ? Give its mathematical form.

   (c) A company owns two flour mills, A and B, which have different production capacities for high, medium and low grade flour. This company has entered into a contract to supply flour to a firm every week with minimum of 12, 8 and 24 quintals of high, medium and low grade, respectively. It costs the company Rs. 1,000 and Rs. 800 per day to run mill A and B respectively. On a day, mill A produces 6, 2 and 4 quintals of high, medium and low grade flour respectively; mill B produces 2, 2 and 12 quintals of high, medium and low grade flour respectively. How many days per week should each mill be operated in order to meet the contract most economically ? Formulate the Linear Programming Problem and solve graphically. 4,4,8

3. (a) Solve the following LPP using Simplex method :

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

   Subject to the constraints :

   $2x_1 + 3x_2 \leq 8$

   $2x_2 + 5x_3 \leq 10$

   $3x_1 + 2x_2 + 4x_3 \leq 15$

   $x_1, x_2, x_3 \geq 0.$

   (b) Find the dual of the following primal linear programming problem and solve the primal from the solution of the dual problem :

   Minimize : $-3x_1 + 2x_2 + x_4$

Subject to :

$2x_1 + x_2 + x_3 + 2x_4 \geq 7$

$x_2 + 3x_4 = 5$

$x_1, x_2 \geq 0, x_3 \leq 0, x_4$ unrestricted. 8,8

SECTION–C

4. Consider the transportation problem having the following parameter table :

		Destination			
		1	2	3	Supply
Source	1	13	16	15	18
Source	2	18	15	16	14
Demand		10	5	10	

(a) Use the Northwest corner rule to obtain an initial basic feasible solution and objective function value.

(b) Use the transportation simplex method to find an optimal solution. Identify the optimal solution and the objective function value. 8,8

5. (a) What is dynamic programming ? Differentiate between deterministic and probabilistic dynamic programming. Give applications of dynamic programming.

(b) Solve the following integer programming problem using Branch and bound technique :

Maximize $Z = 10x_1 + 20x_2$,

subject to the constraints :

$6x_1 + 8x_2 \leq 48$

$x_1 + 3x_2 \leq 12$

$x_1, x_2 \geq 0$, and integers. 8,8

SECTION–D

6. Describe the role of Knowledge Management System (KMS) in capturing and applying knowledge within a business. Illustrate your answer with suitable real-world examples. 16

7. Describe the major components of a typical Accounting Information System (AIS), and discuss the function of each of these components in providing managerial support. Illustrate your answer with a diagram showing how the AIS relate to other corporate information systems. 16

SECTION–E

8. Describe the major operations performed by a Manufacturing Information System. Explain the function of any two sub-systems of Manufacturing Information System. 16

9. What is the utility of Financial Information System (FIS) in an organization ? Briefly describe the forecasting and funds management subsystems of financial information system. 16