UG 5th Semester Examination 2021

COMPUTER SCIENCE (Honours)

Paper Code : DSE-2

[CBCS]

Full Marks: 32 **Time: 2 hours**

DSE – 2A

Operation Research

The figures in the margin indicate full marks.

Group -A (2×6 = 12)

Answer any six questions.

1. (a) What do you mean by feasible solution of a Linear Programming Problem(L.P.P.)?
   (b) What do you mean by artificial variables?
   (c) What is Assignment Problem in L.P.P.?
   (d) What is symmetric game?
   (e) What is meant by non-degenerate basic feasible solution of a transportation problem?
   (f) What is saddle point?
   (g) What do you mean by PERT?

Group -B (10 × 2 = 20)

Answer any two questions.

2. a) Make the graphical representation of the set of constraints in the following L.P.P.:

$$\text{Maximize} \quad z = 10x_1 + 15x_2$$

$$\text{Subject to} \quad x_1 + x_2 \geq 2,$$

$$3x_1 + 2x_2 \leq 6,$$

$$x_1, x_2 \geq 0 .$$

and find the extreme points of the region of feasible solutions. Find also the maximum value of the objective function.

b) Describe Critical Path Method (CPM) Scheduling Technique briefly. 5+5

3. a) Obtain the dual of the following L.P.P.

$$\text{Maximize} \quad z = 2x_1 + 5x_2 + 6x_3$$

$$\text{Subject to} \quad 5x_1 + 6x_2 - x_3 \leq 3,$$

$$-2x_1+x_2+4x_3 \le 4,$$
$$x_1-5x_2+3x_3 \le 1,$$
$$-3x_1-3x_2+7x_3 \le 6,$$
$$x_1, x_2, x_3 \ge 0 .$$

Also verify that the dual of the dual problem is the primal problem.

b) Use dual simplex method to solve the L.P.P.:

Minimize $z = 10x_1 + 6x_2+2x_3$

Subject to $-x_1 + x_2 +x_3 \ge 1,$

$3x_1 + x_2 -x_3 \ge 2,$

$x_1, x_2, x_3 \ge 0.$

5+5

4. a) Obtain an optimal basic feasible solution to the following transportation problem using VAM:

	W1	**W2**	**W3**	**W4**	
F1	19	30	50	10	**7**
F2	70	30	40	60	**9**
F3	40	8	70	20	**18**
	5	**8**	**7**	**14**	

b) Consider the problem of assigning four operators to four machines. The assignment costs in rupees are given here. Operator 1 cannot be assigned to machine III and operator 3 cannot be assigned to machine IV. Find the optimal cost of assignment.

	I	**II**	**III**	**IV**
1	5	5	-	2
2	7	4	2	3
3	9	3	5	-
4	7	2	6	7

5+5

DSE-2B

(Intelligent System)

Time: 2 hrs **Full Marks: 32**

Group- A

Answer *any Six* questions from question no.1. Each question carries *two* marks [2×6=10]

1. a) Explain rational agents and rationality?
   b) What is game theory? How is it important in AI?
   c) Why do we need Artificial Intelligence?
   d) What are the types of AI?
   e) What is the intelligent agent in AI, and where are they used?
   f) What is heuristic search?
   g) What do you infer from hill-climbing search algorithm?

Group- B

Answer any <u>Two</u> questions [10×2=20]

2) a. Explain various properties of knowledge representation.
   b. Give a brief introduction to the Turing test in AI? 5+5=10

3) a. Write down the A* algorithm.
   b. Explain the Min-Max algorithms. 5+5=10

4) Write a short note (any two)
   a) Depth First Search
   b) Alpha-Beta pruning algorithms
   c) Hill Climbing Algorithm 5+5=10