Roll No												

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

MAKEUP EXAMINATION – JAN 2023

Course Code: CSE 226
Course Name: Optimization Techniques
Program : B. Tech

Date: 30-JAN-2023
Time: 01:00PM – 04:00PM
Max Marks: 100
Weightage: 50 %

Instructions:

(i) Read all the questions carefully and answer accordingly.
(ii) Scientific and non-programmable calculators are permitted.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries TWO marks. (10Q x 2M = 20M)

1. In LPP _____ are expressed in the form of inequalities or equations.
(C.O.No.1) [Knowledge]
2. The set of values of decision variables x_j $(j = 1, 2, \ldots, n)$ that satisfy all the constraints and non-negativity conditions of an LP problem is called _____ to that LP problem.
(C.O.No.1) [Knowledge]
3. The area which is bounded by all the constraints including all the boundary points is called _____.
(C.O.No.1) [Knowledge]
4. If the objective function is Minimize in the simplex method, then the optimal solution is Max z* = -20 attains at x = 2 and y = 5, then the original solution is _____.
(C.O.No.2) [Knowledge]
5. The dual of dual problem is known as _____. (C.O.No.2) [Knowledge]
6. When total supply is equal to total demand in a transportation problem, the problem is said to be _____. (C.O.No.3) [Knowledge]
7. The method used for solving an assignment problem is called _____.
(C.O.No.3) [Knowledge]
8. An activity which must be completed before one or more other activities start is known as_____. (C.O.No.4) [Knowledge]
9. Draw the network diagram for the activity C must follow the activity A, and the activity D must follow A and B. (C.O.No.4) [Knowledge]

10. The _____ is the sequence of critical activities between the start event and end event of a project. (C.O.No.4) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries TEN marks. (5Q x 10M = 50M)

11. Solve the following LPP using graphical method

Maximize $z = 3x_1 + 2x_2$

subject to

$$x_1 - x_2 \geq 1$$
$$x_1 + x_2 \geq 3$$
$$x_1, x_2 \geq 0$$

(C.O.No.1) [Comprehension]

12. Solve by using Big-M method

Maximize $z = 3x_1 + 2x_2$

Subject to

$$2x_1 + x_2 \leq 2$$
$$3x_1 + 4x_2 \geq 12$$
$$x_1, x_2 \geq 0$$

(C.O.No.2) [Comprehension]

13. Solve the following LPP using dual simplex method

Minimize $z = 5x + 6y$

Subject to

$$x + y \geq 2$$
$$4x + y \geq 4$$
$$x, y \geq 0.$$

(C.O.No.2) [Comprehension]

14. Obtain the initial solution for the following TP using North-West corner rule and Vogel approximation method.

	D1	**D2**	**D3**	**D4**	**Supply**
O1	1	2	3	4	**6**
O2	4	3	2	0	**8**
O3	0	2	2	1	**10**
Demand	**4**	**6**	**8**	**6**	

(C.O.No.3) [Comprehension]

15. Draw the PERT diagram and determine critical path and the total duration of the following project.

Activity	$1-2$	$1-3$	$1-5$	$2-3$	$2-4$	$3-4$	$3-5$	$3-6$	$4-6$	$5-6$
Duration	8	7	12	4	10	3	5	10	7	4

(C.O.No.4) [Comprehension]

Part C [Problem Solving Questions]

Answer all the Questions. Each question carries FIFTEEN marks. (2Q x 15M = 30M)

16. Solve the following by simplex method

Maximize $z = x + 1.5y$

subject to

$$x + 2y \leq 160,$$

$$3x + y \leq 240,$$

$$x, y \geq 0.$$

(C.O.No.2) [Comprehension]

17. A company is producing a single product and selling it through five agencies situated in different cities. All of a sudden, there is a demand for the product in five more cities that do not have any agency of the company. The company is faced with the problem of deciding on how to assign the existing agencies to dispatch the product to the additional cities in such a way that the travelling distance is minimized. The distances (in km) between the surplus and deficit cities are given in the following distance matrix.

Deficit city / Surplus city	**I**	**II**	**III**	**IV**	**V**
A	160	130	175	190	200
B	135	120	130	160	175
C	140	110	155	170	185
D	50	50	80	80	110
E	55	35	70	80	105

Determine the optimum assignment schedule. (C.O.No.3) [Comprehension]