DEPARTMENT OF MECHANICAL ENGINEERING

UNIVERSITY INSTITUTE OF ENGINEERINGAND TECHNOLOGY, CSJM UNIVERSITY, KANPUR

Industrial Management & Production System (MEE-S403)

Semester: 2022-23 (Odd Semester) **Year: 4rd Year (2K18)**

Mid Semester Examination

Time: 1.5 h **Maximum marks: 30**

All questions are compulsory

Section A

9 marks (9 questions of 1 mark each)

1. In the simplex method, the slack, surplus and artificial variables are restricted to be

(a) multiplied (b) negative

(c) none-negative (d) divided

2. In simplex method basic solution set as n-m, all the variables other than basic are classified as

(a) constant variable (b) non positive variables

(c) basic variables (d) none basic variable

3. In simplex method, the feasible basic solution must satisfy the

(a) non-negativity constraint (b) negativity constraint

(c) basic constraint (d) common constraint

4. The third requirement of simplex method is that all the variables are restricted to include

(a) negative even values (b) odd values

(c) even values (d) non-negative values

5. According to algebra of simplex method, the slack variables are assigned zero coefficients because

(a) no contribution in objective function

(b) high contribution in objective function

(c) divisor contribution in objective function

(d) base contribution in objective function

6. What is degeneracy in simplex method?

7. What is Linear programing problem?

8. Differentiate between basic variable and non-basic variable in simplex method.

9. What do you understand by feasible and non-feasible region in simplex problem?

Section B

9 marks (3 questions of 3 marks each)

1. Minimize $z = 4x_1 + x_2$

Subject to $3x_1 + x_2 = 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 4$

$x_1 \geq 0,\ x_2 \geq 0$

Solve this LPP using Big M-method

2. What is transportation problem and explain Northwest corner method using suitable example.

3. What is Economic order quantity?

Section C

12 marks (2 questions of 6 marks each, Each question can have parts)

1. Maximise $50x_1 + 60x_2$

Subjected to:

$2x_1 + x_2 \leq 300$

$3x_1 + 4x_2 \leq 509$

$4x_1 + 7x_2 \leq 812$

$x_1 \geq 0,\ x_2 \geq 0$

Solve this LPP using simplex method

2. Minimize $z = 4x_1 + x_2$

Subject to $3x_1 + x_2 = 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 4$

$x_1 \geq 0,\ x_2 \geq 0$

Solve this LPP using Graphical method