**PRACTICAL.N0:-8**

**Python program to solve the following LPP by simplex method**

**NAME: ROLL.NO:**

**Q.1 Solve the following LPP by Simplex Method.**

**1] Minimize Z=x1-3x2+2x3**

**Subject to constraint: 3x1-x2+2x3<=7**

**-2x1+4x2<=12**

**-4x1+3x2+8x3<=10**

**& X1,x2,x3>=0**

**from pulp import\***

**z=LpProblem('Problem',LpMinimize)**

**x1=LpVariable('x1',lowBound=0)**

**x2=LpVariable('x2',lowBound=0)**

**x3=LpVariable('x3',lowBound=0)**

**z+=x1-3\*x2+2\*x3**

**z+=3\*x1-x2+2\*x3<=7**

**z+=-2\*x1+4\*x2<=12**

**z+=-4\*x1+3\*x2+8\*x3<=10**

**print(z)**

**z.solve()**

**print('x1=',value(x1),'x2=',value(x2),'x3=',value(x3),'z=',value(z.objective))**

**OUTPUT->-**

**Problem:**

**MINIMIZE 1\*x1 + -3\*x2 + 2\*x3 + 0**

**SUBJECT TO \_C1: 3 x1 - x2 + 2 x3 <= 7**

**\_C2: - 2 x1 + 4 x2 <= 12**

**\_C3: - 4 x1 + 3 x2 + 8 x3 <= 10**

**VARIABLES:**

**x1 Continuous**

**x2 Continuous**

**x3 Continuous**

**ANS->**

**x1= 4.0 x2= 5.0 x3= 0.0 z= -11.0**

**2] Minimize Z=2x1+3x2**

**Subject to constraint: -3x1+4x2<=12**

**x2<=2**

**& x1,x2>=0**

**from pulp import\***

**z=LpProblem('Problem',LpMinimize)**

**x1=LpVariable('x1',lowBound=0)**

**x2=LpVariable('x2',lowBound=0)**

**z+=2\*x1-3\*x2**

**z+=-3\*x1+4\*x2<=12**

**z+=x2<=2**

**print(z)**

**z.solve()**

**print('x1=',value(x1),'x2=',value(x2),'z=',value(z.objective))**

**OUTPUT->**

**Problem:**

**MINIMIZE 2\*x1 + -3\*x2 + 0**

**SUBJECT TO \_C1: - 3 x1 + 4 x2 <= 12**

**\_C2: x2 <= 2**

**VARIABLES**

**x1 Continuous**

**x2 Continuous**

**ANS->**

**x1= 0.0 x2= 2.0 z= -6.0**

**3] Minimize Z=-2x1-2x2**

**Subject to constraint: -x1+x2<=2**

**-x1+3x2<=12**

**x1-4x2<=4**

**& x1,x2>=0**

**from pulp import\***

**z=LpProblem('Problem',LpMinimize)**

**x1=LpVariable('x1',lowBound=0)**

**x2=LpVariable('x2',lowBound=0)**

**z+=-2\*x1-2\*x2**

**z+=-x1+x2<=2**

**z+=-x1+3\*x2<=12**

**z+=x1-4\*x2<=4**

**print(z)**

**z.solve()**

**print('x1=',value(x1),'x2=',value(x2),'z=',value(z.objective))**

**OUTPUT->**

**Problem: MINIMIZE -2\*x1 + -2\*x2 + 0**

**SUBJECT TO \_C1: - x1 + x2 <= 2**

**\_C2: - x1 + 3 x2 <= 12**

**\_C3: x1 - 4 x2 <= 4**

**VARIABLES:**

**x1 Continuous**

**x2 Continuous**

**ANS->**

**x1= 3.0 x2= 5.0 z= -16.0**

**4] Minimize Z=-3x1-3x2-2x3**

**Subject to constraint: x1+x2+2x3<=20**

**2x1+x2-4x3<=32**

**& x1,x2,x3>=0**

**from pulp import\***

**z=LpProblem('Problem',LpMinimize)**

**x1=LpVariable('x1',lowBound=0)**

**x2=LpVariable('x2',lowBound=0)**

**x3=LpVariable('x3',lowBound=0)**

**z+=-3\*x1-3\*x2+2\*x3**

**z+=x1+x2+2\*x3<=20**

**z+=2\*x1+x2+4\*x3<=32**

**print(z)**

**z.solve()**

**print('x1=',value(x1),'x2=',value(x2),'x3=',value(x3),'z=',value(z.objective))**

**OUTPUT->**

**Problem:**

**MINIMIZE -3\*x1 + -3\*x2 + 2\*x3 + 0**

**SUBJECT TO \_C1: x1 + x2 + 2 x3 <= 20**

**\_C2: 2 x1 + x2 + 4 x3 <= 32**

**VARIABLES:**

**x1 Continuous**

**x2 Continuous**

**x3 Continuous**

**ANS->**

**x1= 0.0 x2= 20.0 x3= 0.0 z= -60.0**

**5] Minimize Z=-20x1-x2-2x3**

**Subject to constraint: x1+4x2-x3<=20**

**x1+x2<=10**

**3x1+5x2-3x3<=50**

**& x1,x2,x3>=0**

**from pulp import\***

**z=LpProblem('Problem',LpMinimize)**

**x1=LpVariable('x1',lowBound=0)**

**x2=LpVariable('x2',lowBound=0)**

**x3=LpVariable('x3',lowBound=0)**

**z+=-20\*x1-x2-2\*x3**

**z+=x1-4\*x2-x3<=20**

**z\_=x1+x2<=10**

**z+=3\*x1+5\*x2-3\*x3<=50**

**print(z)**

**z.solve()**

**print('x1=',value(x1),'x2=',value(x2),'x3=',value(x3),'z=',value(z.objective))**

**OUTPUT->**

**Problem: MINIMIZE -20\*x1 + -1\*x2 + -2\*x3 + 0**

**SUBJECT TO \_C1: x1 - 4 x2 - x3 <= 20**

**\_C2: 3 x1 + 5 x2 - 3 x3 <= 50**

**VARIABLES:**

**x1 Continuous**

**x2 Continuous**

**x3 Continuous**

**ANS->**

**x1= 16.666667 x2= 0.0 x3= 0.0 z= -333.33334**