Registration No :

Total Number of Pages : 02   B.Tech
                                                                                            HSSM3302
6th Semester Back Examination 2018-19
OPTIMIZATION IN ENGINEERING
BRANCH : AEIE, AUTO, CHEM, CIVIL, CSE, ECE, EEE, EIE, ELECTRICAL, ENV, ETC,
FASHION, FAT, IEE, IT, ITE, MANUFAC, MANUTECH, MARINE, MECH, METTA,
MINERAL, MINING, MME, PLASTIC, TEXTILE
Time : 3 Hours
Max Marks : 70
Q.CODE : F269
Answer Question No.1 which is compulsory and any FIVE from the rest.
The figures in the right hand margin indicate marks.

Q1   **Answer the following questions :**   (2 x 10)
  a)   What is slack variable?
  b)   Write Degenerate solution?
  c)   What is Basic feasible solution?
  d)   Write short note on Transportation problem?
  e)   Define convex set and convex function?
  f)   What is basic concept of Kuhn Tucker Condition?
  g)   What is stepping stone method?
  h)   What is sensitivity analysis?
  i)   What is Integer programming problem?
  j)   Define an unsymmetrical dual problem?

Q2 **a)** Use Graphical method to solve the L.P.P. :   (5)
              Maximize z= $x_1 + x_2$ subject to the constraints:
                  $x_1 + x_2 \leq 1$
                  $-3x_1 + x_2 \geq 3$ $x_1, x_2 \geq 0$

      b) Use Two Phase Simplex method to solve the L.P.P. :   (5)
                  Maximize Z= $2x_1 + x_2 + x_3$
                  Subject to the constraints:
                  $4x_1 + 6x_2 + 3x_3 \leq 8$
                  $3x_1 - 6x_2 - 4x_3 \leq 1$
                  $2x_1 + 3x_2 - 5x_3 \geq 4$
                  $x_1, x_2, x_3 \geq 0$

Q3 **a)** Solve the Zero One Programming problem   (5)

              max z = $x_1 + 2x_2 + x_3$

              subject to $x_1 + 2x_2 + x_3 \leq 10$

                              $2x_1 - 3x_2 - 4x_3 \leq 14$

                              $3x_1 + 5x_2 + x_3 \leq 6$

              & $x_i \geq 0$ or 1 for all i.

      b) Solve the Nonlinear programming problem by Lagrange's multipliers   (5)

              Maximize Z= $(x_1)^2 + (x_2)^2 + 3x_1 + 4x_2$

              Subject to the constraints:

              $2x_1 + x_2 = 10$

              $x_1, x_2 \geq 0$

Q4 **a)** Use DUAL Simplex method to solve the L.P.P. : **(5)**

$$\text{Maximize } Z = -3x_1 - 2x_2$$

Subject to the constraints:

$$x_1 + x_2 \geq 1$$
$$2x_1 + 3x_2 \geq 2$$
$$x_1, x_2 \geq 0$$

b) Solve by Fibonacci Search method **(5)**

Minimize $f(x) = x^2 + 54/x$ in the interval $(0,5]$

Q5 **a)** Solve by Projected Gradient method **(5)**

Minimize $f(X) = x^2 + 3(x_2)^2$ starting initial point $(6,3)$

where $X = x_1 \, i + x_2 \, j$

b) Solve the Dynamic Programming problem **(5)**

$$\text{Minimize } Z = Y_1^2 + Y_2^2 + Y_3^2$$

Subject to $Y_1 + Y_2 + Y_3 = 15$

& $Y_i \geq 0$

Q6 Solve by Branch and Bound method **(10)**

$$\text{Minimize } Z = 4X_1 + 3X_2$$

Subject to $5X_1 + 3X_2 \geq 30$

$X_1 \leq 4$, $X_2 \leq 6$ & $X_i \geq 0$ & integers.

Q7 FIND THE OPTIMAL SOLUTION BY MODI METHOD **(10)**

11	13	17	14	250
16	18	14	10	300
21	24	13	10	400
200	225	275	250	950

Q8 **Write short answer on any TWO :** **(5 x 2)**
a) Quadratic programming problem

b) Genetic Algorithm

c) Nonlinear programming problem