

Registration No :

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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:

$$\begin{aligned}x_1 + x_2 &\leq 1 \\ -3x_1 + x_2 &\geq 3 \quad x_1, x_2 \geq 0\end{aligned}$$

b) Use Two Phase Simplex method to solve the L.P.P. : **(5)**

$$\begin{aligned}\text{Maximize } Z &= 2x_1 + x_2 + x_3 \\ \text{Subject to the constraints:} \\ 4x_1 + 6x_2 + 3x_3 &\leq 8 \\ 3x_1 - 6x_2 - 4x_3 &\leq 1 \\ 2x_1 + 3x_2 - 5x_3 &\geq 4 \\ x_1, x_2, x_3 &\geq 0\end{aligned}$$

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

$$\begin{aligned}\max z &= x_1 + 2x_2 + x_3 \\ \text{subject to } x_1 + 2x_2 + x_3 &\leq 10 \\ 2x_1 - 3x_2 - 4x_3 &\leq 14 \\ 3x_1 + 5x_2 + x_3 &\leq 6 \\ \& \quad x_i \geq 0 \text{ or } 1 \text{ for all } i.\end{aligned}$$

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

$$\begin{aligned}\text{Maximize } Z &= (x_1)^2 + (x_2)^2 + 3x_1 + 4x_2 \\ \text{Subject to the constraints:} \\ 2x_1 + x_2 &= 10 \\ x_1, x_2 &\geq 0\end{aligned}$$

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

$$\begin{aligned} &\text{Maximize } Z = -3x_1 - 2x_2 \\ &\text{Subject to the constraints:} \\ &x_1 + x_2 \geq 1 \\ &2x_1 + 3x_2 \geq 2 \\ &x_1, x_2 \geq 0 \end{aligned}$$

210 210 **b)** Solve by Fibonacci Search method 210 210 **(5)** 210

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

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

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

$$\text{where } X = x_1 i + x_2 j$$

210 210 **b)** Solve the Dynamic Programming problem **(5)** 210 210

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

$$\text{Subject to } Y_1 + Y_2 + Y_3 = 15$$

$$\& Y_i \geq 0$$

210 210 **Q6** Solve by Branch and Bound method 210 210 **(10)** 210

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

$$\text{Subject to } 5X_1 + 3X_2 \geq 30$$

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

210 210 **Q7** FIND THE OPTIMAL SOLUTION BY MODI METHOD **(10)** 210 210

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

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