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**VISHNUPUR: BHIMAVARAM**

Mid – I Examinations

**Optimization Techniques (R23) for II-II AI&MLAI&DS and IT**

**Question Bank (Descriptive)**

**Unit-I**

| 1. | a) | Explain Classification of Optimization Problems | L1 | CO1 | [5M] |
| --- | --- | --- | --- | --- | --- |
|  | b) | State the necessary and sufficient conditions of single variable Optimization Techniques without constraints | L3 | CO1 | [5M] |
| 2. |  | Does the solution maximum or minimum Objective function?  Optimize z =  Subject to | L5 | CO1 | [10M] |
| 3. | a) | Find the optimum solution  Min. )  Subject to | L5 | CO1 | [5M] |
|  | b) | Explain necessary Kuhn Tucker conditions | L4 | CO1 | [5M] |
| 4. | a) | Find the values of x, y, and z that maximize the function when x,y,z are restricted by the relation xyz = 16. | L5 | CO1 | [5M] |
|  | b) | State and explain the necessary conditions for existence of relative optima in case of multivariable objective functions with equal constraints | L5 | CO1 | [5M] |
| 5 | a) | Find the Maxima and Minima, if any, of the function  Max | L5 | CO1 | [5M] |
|  | b) | State and explain the sufficient conditions for existence of relative optima in case of multivariable objective functions with equal constraints | L5 | CO1 | [5M] |
| 6 |  | Use Kuhn –Tucker conditions to solve  Max z =  Subject to  2 | L3 | CO1 | [10M] |
| 7 | a | Find Optimality to the  Objective function  z =  Subject to | L4 | CO1 | [5M] |
|  | b | Explain sufficient Kuhn Tucker conditions | L3 | CO1 | [5M] |
| 8 | a | Obtain necessary and sufficient conditions for  Min  Subject to | L4 | CO1 | [5M] |
|  | b | Explain the difference between linear and nonlinear programming problems | L2 | CO1 | [5M] |
| 9 | a | What are the various applications of optimization problems | L2 | CO1 | [5M] |
|  | b | Check the definite of the function  f(x) = at the point (0,1.5) and (2,2) | L3 | CO1 | [5M] |
| 10 |  | Solve the following  Min z =  Subject to | L4 | CO1 | [10M] |

| **Unit-II** | | |  |  |  |
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| 1. | a) | Write the steps for simplex algorithm | L1 | CO2 | [5M] |
|  | b) | Solve the following function by simplex method  Maximize Z= 10X1+ 8X2  Subject to constraints:  X1 + 2X2 ≤ 1000  X1 ≤ 300  X2 ≤ 500  and X1 ≥ 0, X2 ≥ 0 | L3 | CO2 | [5M] |
| 2. |  | Solve the following function by simplex method  Maximize Z= 6X1+ 9X2  Subject to constraints:  2X1 + 2X2 ≤ 24  X1 + 5X2 ≤ 44  6X1 + 2X2 ≤ 60 and X1 ≥ 0, X2 ≥ 0 | L5 | CO2 | [10M] |
| 3. | a) | Solve the following function by simplex method  Minimize Z= X1 - 3X2 + 2X3  Subject to constraints:  3X1 - X2 + 2X3 ≤ 7  -2X1 + 4X2 ≤ 12  4X1 + X2 + X3 ≤ 6 and X1 ≥ 0, X2 ≥ 0 , X3 ≥ 0 | L5 | CO2 | [5M] |
|  | b) | Solve the following LPP by graphical method:  Minimize *Z*=20*x*1+10*x*2  subject to *x*1+2*x*2≤403*x*1+*x*2≥30 4*x*1+3*x*2≥60  *x*1*, x*2≥0*.* | L4 | CO2 | [5M] |
| 4. | a) | Solve the following function by simplex method  Maximize Z= X1 + 2X2 + X3  Subject to constraints: 2X1 + X2 – X3 ≤ 2  -2X1 + X2 – 5X3 ≥ -6  4X1 + X2 + X3 ≤ 6 and  X1 ≥ 0, X2 ≥ 0, X3 ≥ 0 | L5 | CO2 | [5M] |
|  | b) | Solve the following LPP by graphical method:  Maximize *Z* =4*x*1+3*x*2  subject to  *x*1+2*x*2≤6  2*x*1+*x*2≤8  *x*1≥7  *x*1*, x*2≥0*.* | L5 | CO2 | [5M] |
| 5 | a) | Solve the following system of equations using pivot operations:  6x1 − 2x2 + 3x3 = 11, 4x1 + 7x2 + x3 = 21 , 5x1 + 8x2 + 9x3 = 48 | L5 | CO2 | [5M] |
|  | b) | State the following LP problem in standard form:  Maximize f = −2x1 − x2 + 5x3 subject to  x1 − 2x2 + x3 ≤ 8, 3x1 − 2x2 ≥ −18, 2x1 + x2 − 2x3 ≤ −4 | L2 | CO2 | [5M] |
| 6 |  | Maximize f = 3x + 2y subject to  21x − 4y ≥ −36, x + 2by y ≥ 6 , 6x − y ≤ 72  x ≥ 0, y ≥ 0 | L4 | CO2 | [10M] |
| 7 | a | Solve the following system of equations using pivot operations:  4x1 − 7x2 + 2x3 = −8,  3x1 + 4x2 − 5x3 = −8,  5x1 + x2 − 8x3 = −34 | L4 | CO2 | [5M] |
|  | b | Find the solution of the following LP problem graphically:  Maximize f = 2x1 + 6x2  subject to −x1 + x2 ≤ 1, 2x1 + x2 ≤ 2  x1 ≥ 0, x2 ≥ 0 | L4 | CO2 | [5M] |
| 8 | a | State the following LP problem in standard form:  Maximize f = x1 − 8x2  subject to 3x1 + 2x2 ≥ 6, 9x1 + 7x2 ≤ 108, 2x1 − 5x2 ≥ −35  x1, x2 unrestricted in sign | L4 | CO2 | [5M] |
|  | b | Find all the basic solutions corresponding to the system of equations  2x1 + 3x2 − 2x3 − 7x4 = 1,  x1 + x2 + x3 + 3x4 = 6,  x1 − x2 + x3 + 5x4 = 4 | L4 | CO2 | [5M] |
| 9 |  | Find the solution of the following LP problem graphically:  Minimize f = 3x1 + 2x2  subject to  8x1 + x2 ≥ 8,  2x1 + x2 ≥ 6,  x1 + 3x2 ≥ 6,  x1 + 6x2 ≥ 8,  x1 ≥ 0, x2 ≥ 0 | L2 | CO2 | [10M] |
| 10 |  | Maximize f = x − 4y subject to  x − y ≥ −4, 4x + 5y ≤ 45, 5x − 2y ≤ 20, 5x + 2y ≥ 10 | L4 | CO2 | [10M] |

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