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| LOGO.jpg | **GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY**  (**AN AUTONOMOUS INSTITUTION**)  **(Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu)**  **(Accredited by NAAC with “A” Grade, NBA (EEE,ECE&ME) & ISO9001:2008CertifiedInstitution)** |
| **QUESTIONBANK(DESCRIPTIVE)**  **Subject Name with Code: OPTIMIZATION TECHNIQUES (23A0020T)**  **Course & Branch: B.TECH CSE(DS) Year& Semester: II-II**  **Regulation: RG23** | |

**UNIT - I**

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| **S.No.** | **Question** | | | **[BT Level] [CO][ Marks]** | |
| 1. **Marks Questions (Short)** | | | | | |
|  | | What are limitations of lpp |  | |
|  | | What is an artificial variable. |  | |
|  | | What are the signifince of optimization. |  | |
|  | | What is the purpose of mathematical model. |  | |
|  | | List the applications of optimization problem |  | |
|  | | Write the classification of optimization problem |  | |
|  | | Define objective function and optimum solution with reference to linear programming. |  | |
|  | | Define slack and surplus variables |  | |
|  | | What is unbounded solution with respect to Lpp |  | |
|  | | Define optimization techniques. |  | |
| **Descriptive Questions (Long)** | | | | | |
|  | | | | | |
|  | Solve the following LPP by using graphical method.  Max z = 5x1+3x2  Subject to the constraints,  3x1+5x2  ≤ 15  5x1+2x2  ≤ 10  X1≥0, x2≥0 | | |  | |
|  | Solve the following LPP by using graphical method.  Min z = 4x1+2x2  Subject to the constraints,  x1+2x2 ≥ 2  3x1+x2  ≥ 3  4x1+3x2  ≥ 6  x1, x2≥0 | | |  | |
|  | Solve the following LPP by using simplex method.  Max z = x1+x2+3x3  Subject to the constraints,  3x1+2x2+x3  ≤ 3  2x1+x2+2x3  ≤ 10  x1, x2,x3≥0 | | |  | |
|  | Solve the following LPP by using simplex method.  Min z = -2x1- 3x2  Subject to the constraints,  x1+x2  ≤ 2  x1+x2  ≤ 4  x1,x2 ≥ 0 | | |  | |
| **5.** | Use Big-m method and solve the following lpp  Maxz = 6x1+ 4x2  Subject to the constraints,  2x1+3x2  ≤ 30  3x1+4x2  ≤ 24  x1+x2  ≥ 3  x1,x2 ≥ 0 | | |  | |
| **6.** | Use Big-m method and solve the following lpp  Minz = 4x1+ 3x2  Subject to the constraints,  2x1+x2  ≥ 10  -3x1+2x2  ≤6  x1+x2  ≥ 6  x1,x2 ≥ 0 | | |  | |
| **7.** | Solve the following LPP by using Two Phases simplex method.  Max z = -4x1-3 x2-9x3  Subject to the constraints,  2x1+4x2+6x3  ≥ 15  6x1+x2+x3  ≥ 12  x2 ≤ 4  x1,x2,x3 ≥ 0 | | |  | |
| **8.** | Solve the following LPP by using Two Phases simplex method.  Min z = 3x1- x2  Subject to the constraints,  x1+x2  ≤ 50  x1 ≥ 20  x2 ≤ 40  X1,x2 ≥ 0 | | |  | |
| **9.** | Discuss the nature and scope of quantitative analysis. | | |  | |
| **10.** | Define optimization techniques. What is the importance of optimization techniques in decision making. | | |  | |

**UNIT - II**

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| **S.No.** | **Question** | **[BT Level] [CO][ Marks]** |
| **2 Marks Questions (Short)** | | |
|  | 1. Define Assignment Problem. |  |
|  | 1. How to detect degeneracy in transportaion problem. |  |
|  | 1. Distinguish between transportation problem and assignment problem. |  |
| **4.** | 1. What is the use of vogel’s approximation method |  |
| **5.** | 1. Given the mathematical formulation of assignment problem. |  |
| **6.** | 1. What is the principle of optimality. |  |
| **7.** | 1. Whats is the advantages and disadvantages of nwc. |  |
| **8.** | 1. Explain assumptions of transportaion problem. |  |
| **9.** | 1. Define feasible solution and optimal solution. |  |
| **10.** | 1. Difference between balanced and unbalanced transportaion problem. |  |
| **Descriptive Questions (Long)** | | |
|  | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | W1 | W2 | W3 | W4 | SUPPLY | | P1 | 21 | 40 | 30 | 15 | 10 | | P2 | 60 | 25 | 50 | 55 | 8 | | P3 | 45 | 10 | 60 | 10 | 17 | | DEMAND | 6 | 7 | 8 | 14 |  |   With the help of North-West corner method, solve the following transportation problem. |  |
|  | Using matrix minimum method.find out the intial basic feasible solution of the following transportation problem.also calculate the total transportation cost.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | A | B | C | D | SUPPLY | | X | 21 | 16 | 25 | 13 | 21 | | Y | 17 | 18 | 14 | 22 | 27 | | Z | 32 | 27 | 12 | 41 | 19 | | DEMAND | 14 | 15 | 18 | 20 |  | |  |
|  | Determine the intial basic feasible solution of following transportion problem so as the products are transported at a lowest cost by using VAM.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | TO | A1 | A2 | A3 | A4 | SUPPLY | | X1 | 8 | 12 | 8 | 6 | 4500 | | X2 | 7 | 15 | 7 | 13 | 6000 | | X3 | 5 | 9 | 10 | 11 | 7000 | | DEMAND | 6000 | 4500 | 3000 | 4000 |  | |  |
|  | Find the optimum solution of the following transportation problem using VAM and MODI method, where cells shows the transportation costs in rupes.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | TO | W1 | W2 | W3 | W4 | SUPPLY | | O1 | 6 | 4 | 1 | 5 | 14 | | O2 | 8 | 9 | 2 | 7 | 16 | | O3 | 2 | 6 | 3 | 4 | 15 | | DEMAND | 10 | 12 | 15 | 8 |  | |  |
|  | Applying North West Corner method, solve the following transportation problem.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | TO | A | B | C | D | SUPPLY | | O1 | 6 | 8 | 7 | 12 | 500 | | O2 | 10 | 13 | 9 | 11 | 400 | | O3 | 8 | 10 | 12 | 14 | 900 | | DEMAND | 700 | 500 | 400 | 300 |  | |  |
| **6.** | Solve the following assignment problem using Hungarian method   |  |  |  |  | | --- | --- | --- | --- | | TASKS | | | | | Men | A | B | C | D | | 1 | 45 | 40 | 50 | 67 | | 2 | 57 | 42 | 63 | 55 | | 3 | 49 | 51 | 48 | 64 | | 4 | 41 | 45 | 60 | 55 | |  |
| **7.** | A sales manger has to assign salesman to four terriories. He has four candidates of varying experience and capacities. You are required to find the assigning task to each salesman using assignment model.     |  |  |  |  |  | | --- | --- | --- | --- | --- | | territories | | | | | | Salesman | A | B | C | D | E | | 1 | 70 | 54 | 56 | 74 | 58 | | 2 | 56 | 68 | 58 | 80 | 61 | | 3 | 70 | 48 | 64 | 60 | 72 | | 4 | 48 | 64 | 50 | 64 | 63 | |  |
| **8.** | Consider the following matrix that shows the four jobs done by four machines.using Hungarian method. Assign the jobs in such a manner that maximizes the total profit.   |  |  |  |  | | --- | --- | --- | --- | | MACHINES | | | | | JOBS | M1 | M2 | M3 | M4 | | J1 | 15 | 11 | 13 | 15 | | J2 | 13 | 12 | 12 | 13 | | J3 | 14 | 15 | 16 | 14 | | J4 | 16 | 13 | 11 | 17 | |  |
| **9.** | Explain procedure or of hungarian method to solve the assignment problem |  |
| **10.** | Explain procedure or of NWC and LCM to solve the transportation problem |  |