Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**Supplementary Examination – June – 2017**

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| **Code :** | **14CE3003** | **Duration :** | **3hrs** |
| **Sub. Name :** | **STRUCTURAL OPTIMIZATION** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1. | a. | Solve the following problem by Simplex method  Minimize: Z = x1  - x2 + x3  subject to  2x1  + x2  + x3 ≤ 10  2x1 - x3 ≤ 2  2x1 - 2x2  +3 x3 ≥ 0    x1, x2, x3  ≥ 0 | CO2 | 15 |
| b. | Write notes on i) Design Vector ii) Constraint surface iii) Objective function | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Solve using Big M method  Maximize 3x1 -x2  such that 2x1 + x2 ≥ 2  x1 + 3x2 ≤ 3  x2 ≤ 4 | CO2 | 15 |
| b. | Explain the basic concept of structural optimization | CO1 | 5 |
| 3. | a. | Maximize - 4x2 + 36 x - 15 using unrestricted search . Take initial trail of 10 and starting step size as 0.1 | CO2 | 15 |
|  | b. | Find the duality of the given problem  Maximize Z= 3x+2y  subject to x + y ≥ 1  x + y ≤ 7  x + 2y ≤10  x,y ≥0 | CO1 | 5 |
| (OR) | | | | |
| 4. | a. | Use dichotomous search technique to minimize x5 -5x3 -20x + 5 in the interval 1 to 5 taking δ = 0.2 | CO2 | 15 |
|  | b. | What are the different methods for solving non-linear programming problem? | CO1 | 5 |
| 5. |  | Solve f = 2 x1-1 x2-1 + (3/2 )x2-2 + 2 x1 x22 | CO2 | 20 |
| (OR) | | | | |
| 6. | a. | How can an multistage decision problem solved using dynamic programming technique? | CO2 | 12 |
|  | b. | Enumerate on the basic characteristic of dynamic programming problem? | CO1 | 8 |
| 7. | a. | State the advantages and disadvantage of genetic algorithm? | CO1 | 8 |
|  | b. | Explain the different operators used in genetic algorithm in details by means of sketches? | CO1 | 12 |
| (OR) | | | | |
| 8. | a. | Explain about the neural networks and enumerate on back proportion algorithm. | CO1 | 10 |
|  | b. | Explain the concept of ant colony algorithm and how it is used in solving optimiztion problem. | CO1 | 10 |
|  | | **Compulsory:** |  |  |
| 9. |  | By taking an illustation explain how fuzzy theory can applied in engineering problems? | CO2 | 20 |

ALL THE BEST