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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

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

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14MA3010** | **Duration :** | **3hrs** |
| **Sub. Name :** | **GRAPH THEORY AND ALGORITHMS** | **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. | Define unicursal graph and hence prove that in a connected graph G with exactly 2k odd vertices there exists a k edge – disjoint subgraphs such that they together contain all edges of G and each is a unicursal graph | CO1 | 10 |
| b. | Draw all the spanning trees of the following graph shown below | CO 1 | 10 |
| (OR) | | | | |
| 2. |  | Given the adjacency matrix of the graph G, draw the graph G, give five observations on  also find and give three observations. | CO 1 | 20 |
| 3. |  | Prove that  and are nonplanar, with diagrams. | CO 1 | 20 |
| (OR) | | | | |
| 4. |  | State and prove five colour theorem. What is the chromatic number of the graph given below, assign a proper colouring of your choice. | CO 1 | 20 |
| 5. |  | Using Dijkstra’s algorithm find the shortest path between the vertices  to the vertex for the graph given below. | CO 2 | 20 |
| (OR) | | | | |
| 6. | a. | Give the Kruskal’s algorithm and hence find the minimum spanning tree for the given weighted graph. | CO 2 | 10 |
|  | b. | Give the Prim’s algorithm and hence find the minimum spanning tree for the given weighted graph. | CO 2 | 10 |
| 7. | a. | Solve the following LPP by graphical method    Subject to | CO 3 | 10 |
|  | b. | Using simplex method solve the LPP    Subject to | CO 3 | 10 |
| (OR) | | | | |
| 8. | a. | Solve the following LPP by graphical method    Subject to | CO 3 | 10 |
|  | b. | Using simplex method solve the LPP    Subject to | CO 3 | 10 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Represent the maze given below by means of a graph such that a vertex denotes either a corridor or a dead end, as numbered. An edge represents a possible path between two vertices. Solve the maze. | CO 1 | 10 |
|  | b. | Draw a graph with 36 vertices representing the squares of a chessboard. Join these vertices appropriately by edges, each representing a move of the knight. Find the degree of each vertex. | CO 1 | 10 |

ALL THE BEST