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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **Ph.D. Course Work End Term Examinations – JAN-FEB 2025** |
| **Date:** 30 – 01-2025 **Time:** 09:30 am – 12:30 pm |

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| --- | --- | --- |
| **School:** SOE | **Program:** Ph.D. | |
| **Course Code :**MAT817 | **Course Name :** Distance in graphs | |
| **Semester**: | **Max Marks**:100 | **Weightage**:50% |

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| --- | --- | --- | --- | --- | --- |
| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **20** | **20** | **30** | **30** | **Nil** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| --- | --- | --- | --- | --- |
| **Answer ALL the Questions. Each question carries 10 marks. 6Q x 10M=60Marks** | | | | |
| **1** | Prove that , a graph G is self-centered if and only if each node of G is eccentric. | **10 Marks** | **L2** | **CO1** |
| **2** | Find a formula for the cutting number of a node v in tree T in terms of the number of nodes in each branch at v. | **10 Marks** | **L2** | **CO1** |
| **3** | Prove that, a nontrivial graph G is radius minimal if and only if G is a tree. | **10 Marks** | **L2** | **CO2** |
| **4** | Explain the diameter minimal and diameter critical graphs with proving every graph G can be embedded as an induced subgraph in a diameter minimal graph of diameter two. | **10 Marks** | **L2** | **CO2** |
| **5** | Construct a minimal order four regular, four connected graph of diameter 3. | **10Marks** | **L2** | **CO3** |
| **6** | Apply procedure closure (P,A) algorithm to show that graph G and H pass through a cycle. | **10 Marks** | **L2** | **CO4** |

**Part B**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Answer the Questions. Each question carries 20 marks 2Q x 20 = 40 Marks** | | | | | |
| **7.** |  | Find the initial matching for the graph in maximum matching algorithm using the procedure AUGUMENT. | **20 Marks** | **L3** | **CO3** |
|  | | | | | |
| **8.** |  | Prove the result of a graph by applying Breadth first search algorithm and Depth first search algorithms. | **20 Marks** | **L3** | **CO4** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***