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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** : MAT828 | **Course Name :** APPLIED ANALYSIS | |
| **Semester**: | **Max Marks**:100 | **Weightage**:50% |

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| --- | --- | --- | --- | --- | --- |
| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **40** | **20** | **20** | **20** |  |

**Instructions:**

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

**Part A**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Answer ALL the Questions. Each question carries 10 marks. 6Q x 10M=60M** | | | | |
| **1** | Define bilinear forms over complex vector space and state Hermitian forms. | **10 Marks** | **L2** | **CO2** |
| **2** | Define orthogonal matrices and its properties and prove spectral theorem. | **10 Marks** | **L1** | **CO2** |
| **3** | State and prove Schwertz lemma. | **10 Marks** | **L2** | **CO3** |
| **4** | Write the uses of reflection principal. | **10 Marks** | **L2** | **CO3** |
| **5** | Write note on convergence of Fourier series. | **10 Marks** | **L3** | **CO4** |
| **6** | State and prove Arzela theorem on Equi continuous families. | **10 Marks** | **L3** | **CO4** |

**Part B**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Answer the Questions. Each question carries 20 marks 2Q x 20M= 40 M** | | | | | |
| **7.** |  | State and prove inverse function theorem. | **20 Marks** | **L2** | **CO1** |
|  | | | | | |
| **8.** |  | Define Rank theorem and State and prove implicit function theorem. | **20 Marks** | **L3** | **CO1** |

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