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**PRESIDENCY UNIVERSITY**

**Bengaluru**

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| **End -Term Examinations –JANUARY 2025** |
| **Date:** 02 -01-2025 **Time:**01:00 pm – 04:00 pm |

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| --- | --- | --- |
| **School:** SOCSE/SOE | **Program:** All Programs of CSE and Allied & All Programsof SOE | |
| **Course Code :** MAT1002 | **Course Name :** Transform Techniques, Partial Differential Equations and Their Applications | |
| **Semester**: III | **Max Marks**:100 | **Weightage**: 50% |

|  |  |  |  |  |
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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** |
| **Marks** | **24** | **29** | **18** | **29** |

**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. 10 x2Marks=20Marks** | | | | |
| **1** | Verify whether the function is even or odd? | **2 Marks** | **L1** | **CO1** |
| **2** | Find a0 for f(x)=x in the interval (0,2π). | **2 Marks** | **L1** | **CO1** |
| **3** | Find the Laplace transform of . | **2 Marks** | **L1** | **CO2** |
| **4** | Find the inverse Laplace transform of | **2 Marks** | **L1** | **CO2** |
| **5** | Find the z-transform of | **2 Marks** | **L1** | **CO3** |
| **6** | Find . | **2 Marks** | **L1** | **CO3** |
| **7** | Find . | **2 Marks** | **L1** | **CO3** |
| **8** | Find | **2 Marks** | **L1** | **CO3** |
| **9** | Find the order and degree of | **2 Marks** | **L1** | **CO4** |
| **10** | What is homogenous partial differential equations? | **2 Marks** | **L1** | **CO4** |

**Part B**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Answer the Questions Total 80 Marks** | | | | | |
| **11.** |  | Construct the Fourier series of the function | **10 Marks** | **L3** | **CO1** |
| **Or** | | | | | |
| **12.** |  | Construct the Fourier expansion of over the interval . | **10**  **Marks** | **L3** | **CO1** |
|  |  |  |  |  |  |
| **13.** |  | Construct the half range cosine series of the function | **10 Marks** | **L3** | **CO1** |
| **Or** | | | | | |
| **14.** |  | Construct the Fourier series of defined in the interval by means of the table of values given below. Find the series up to the second harmonics.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | | **10**  **Marks** | **L3** | **CO1** |

|  |  |  |  |  |  |
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| **15.** |  | Find inverse Laplace transform of . | **10 Marks** | **L3** | **CO2** |
| **Or** | | | | | |
| **16.** |  | Apply convolution theorem to find inverse Laplace transform of . | **10**  **Marks** | **L3** | **CO2** |

|  |  |  |  |  |  |
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| **17.** |  | Solve the Z-transform of:  . | **10**  **Marks** | **L3** | **CO3** |
| **Or** | | | | | |
| **18.** |  | Apply Z-transform solve and | **10 Marks** | **L3** | **CO3** |

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| **19.** |  | Form the PDE by eliminating the arbitrary functions from . | **10 Marks** | **L3** | **CO4** |

**Or**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **20.** |  | Solve . Given that when . | **10 Marks** | **L3** | **CO4** |
|  | | | | | |
| **21.** |  | Construct the function in terms of unit step function and hence identify their Laplace transform | **15 Marks** | **L3** | **CO2** |

**Or**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **22.** |  | Apply Laplace transform method to solve  with | **15**  **Marks** | **L3** | **CO2** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **23.** |  | Solve | **15 Marks** | **L3** | **CO4** |
| **Or** | | | | | |
| **24.** |  | Solve subject to conditions when and when . | **15**  **Marks** | **L3** | **CO4** |

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