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**Presidency University**

**Bengaluru**

**SCHOOL OF ENGINEERING**

**SUMMER TERM END TERM EXAMINATION August-2024**

**Summer Term:** 2023- 2024

**Course Code**: MAT2071

**Course Name**: MATHEMATICS FOR ENGINEERS

**Program & Sem**: 2022 BATCH

**Date**: 08/08/2024

**Time**: 1.00pm to 4.00pm

**Max Marks**: 100

**Weightage**: 50%

**Instructions:**

### Read all questions carefully and answer accordingly.

1. *Question paper consists of 3 parts.*
2. *Scientific and non-programmable calculator are permitted.*
3. *Do not write any information on the question paper other than Roll Number.*

**Part A [Memory Recall Questions]**

**Answer any SIX Questions. Each question carries 3 marks. (6Qx 3M= 18M)**

1. Find the sum and product of the Eigen values of . (C.O.No.1) [Knowledge]
2. Define Jacobian of u , v and w with respect to x , y and z. (C.O.No.2) [Knowledge]
3. Find the Laplace transform of . (C.O.No.3) [Knowledge]
4. Find the Laplace transform of . (C.O.No.3) [Knowledge]
5. Find the inverse Laplace transform of  (C.O.No.3) [Knowledge]
6. Find the inverse Z- transform of  (C.O.No.4) [Knowledge]
7. Solve  (C.O.No.5) [Knowledge]
8. Solve  (C.O.No.5) [Knowledge]

**Part B [Thought Provoking Questions]**

**Answer any FIVE Questions. Each question carries 10 marks. (5Qx10M=50M)**

1. Find the coefficient of correlation between the heights of brothers and sisters from the following data and also regression lines

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Heights of brothers in cm x** | 65 | 66 | 67 | 68 | 69 | 70 | 71 |
| **Heights of sisters in cm y** | 67 | 68 | 66 | 69 | 72 | 72 | 69 |

(CO.NO.1) [Comprehensive]

1. If, prove that . (CO.NO.2) [Comprehensive]
2. Evaluate. (CO.NO.2) [Comprehensive]
3. Compute the extreme values of the function .

(CO.NO.2) [Comprehensive]

1. Compute the maximum and minimum values of the function (CO.NO.2) [Comprehensive]
2. Solve  with  using Z-transform method.

(C.O.No.4) [Comprehensive]

1. Solve  (C.O.No.5) [Comprehensive]

**Part C [Problem Solving Questions]**

**Answer any TWO Questions. Each question carries 16 marks. (2Qx16M=32M)**

1. Compute the Eigen values and Eigen vectors of the matrix 

 (CO.NO.1) [Application]

1. Compute the Eigen values and Eigen vectors of the matrix 

 (CO.NO.1) [Application]

1. Use Laplace transform technique to solve  with y(0)=y’(0)=0

(CO.NO.3) [Application]