**Code No.BS101HS**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY(An Autonomous Institution)**

**B.E. (CIVIL/CSE/EEE/ECE/MECH/AI&DS) I-Semester Supplementary Examination, February-2023**

**Subject: ENGINEERING MATHEMATICS-I**

**Time: 3 hours Max.Marks:60**

**Note: Missing data, if any, maybe suitably assumed.**

**PART-A**

**Answer All the questions.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q.No.** | **Questions** | **Marks** |  |  |
| **1. a** | **Find the sum and product of eigen values of the matrix**  | **2** |  |  |
| **b** | **State Caley-Hamilton theorem** | **2** |  |  |
| **c** | **State Rolle’s mean value theorem.** | **2** |  |  |
| **d** | **Find radius of curvature at any point on the curve**  | **2** |  |  |
| **e** | **Expand the function at the point (0,0)** | **2** |  |  |
| **f** | **If then show that**  | **2** |  |  |
| **g** | **Evaluate**  | **2** |  |  |
| **h** | **Evaluate**  | **2** |  |  |
| **i** | **Show that is solenoidal.** | **2** |  |  |
| **j** | **State Gauss divergence theorem** | **2** |  |  |

**PTO**

**PART-B**

**Answer Any Five questions**.

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| **Q.No.** |  |  **Questions** | **Marks** |  |  |
| **2.** | **a** | **Use Caley-Hamilton theorem to find A-1 of the matrix.** | **8** |  |  |
| **b** | **Reduce the matrix to its Echelon form and hence find its rank.** |  |  |  |
| **3.** | **a** | **Verify Cauchy’s mean theorem for the functionsand in the interval [a, b].** | **8** |  |  |
| **b** | **Find the evolute of Parabola .** |  |  |  |
| **4.** | **a** | **If , , , then evaluate at (1, -1, 0).** | **8** |  |  |
| **b** | **Find the minimum value of subject to condition .** |  |  |  |
| **5.** | **a** | **Show that the area enclosed between the curves and .** | **8** |  |  |
| **b** | **Evaluate by changing to polar coordinate.** |  |  |  |
| **6.** |  | **Reduce the following quadratic form to Canonical form by orthogonal transformation**  | **8** |  |  |
| **7.** | **a** | **Obtain Taylors expansion of at**  | **8** |  |  |
| **b** | **If , then show that .** |  |  |  |
| **8.** | **a** | **Show that , where , and**  | **8** |  |  |
| **b** | **Find the directional derivative of at the point (3,1,2) in the direction of vector**  |  |  |  |
| **9.** |  | **Verify Green’s theorem for , where ‘C’ is closed curve of the region bounded and**  | **8** |  |  |

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