**Code No.BS101HS**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY**

**(An Autonomous Institution)**

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

|  |  |  |  |  |
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| **Q.No.** | **Questions** | **Marks** | **CO** | **BTL** |
| **1. a** | **State two properties of eigen values?** | **2** | **1** | **L1** |
| **b** | **Define echelon form of a matrix?** | **2** | **1** | **L1** |
| **c** | **State cauchy’s mean value theorem?** | **2** | **2** | **L2** |
| **d** | **Define radius of curvature.** | **2** | **2** | **L1** |
| **e** | **Evaluate the following**  | **2** | **3** | **L3** |
| **f** | **State any two properties of jacobian.** | **2** | **3** | **L2** |
| **g** | **Change the order of the integration and evaluate**  | **2** | **4** | **L3** |
| **h** | **Define triple integral .** | **2** | **4** | **L1** |
| **i** | **State Green’s Theorem in a plane .** | **2** | **5** | **L2** |
| **j** | **What is irrotational as applied in vector calculus.** | **2** | **5** | **L2** |

**PTO**

**PART-B**

**Answer Any Five questions**.

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| **Q.No.** |  | **Questions** | **Marks** | **CO** | **BTL** |
| **2.** | **a** | **Verify Caley-Hamilton theorem for ‘A’, hence find A-1 if A=**  | **8** | **1** | **L2** |
| **b** | **Test for consistency of the following equations and solve if consistent.****2x-3y+z =0; x+2y-3z = 0; 4x-y-2z=0.** |  | **1** | **L4** |
|  |  |  |  |  |  |
| **3.** | **a** | **Verify Rolle’s theorem for the function f(x) = (x-a)m(x-b)nin [ a,b].** | **8** | **2** | **L2** |
| **b** | **Find the envelope of the family of curves y= mx+(a/m ) , where m is the parameter.** |  | **2** | **L3** |
| **4.** | **a** | **Prove that the function is discontinuous at (0,0).** | **8** | **3** | **L2** |
| **b** | **Expand ex log(1+y) in a Taylor’s series about (0,0).** |  | **3** | **L4** |
| **5.** | **a** | **Evaluate the following integrals by changing to polar coordinates**  | **8** | **4** | **L5** |
| **b** | **Evaluate the following double integral**  |  | **4** | **L5** |
| **6.** | **a** | **Verify Divergence Theorem for = 4xi-2y2j+ z2k , taken over the region bounded by x2+y2 = 4 , z=0 , z=3.** | **8** | **5** | **L4** |
|  |  |  |  |  |
| **7.** | **a** | **Reduce 6x12  + 3x22+ 3x32 – 4x1x2 – 2 x2x­3 + 4 x3x1 to canonical form using orthogonal transformation. Also, find the index, Rank and signature of the matrix.**  | **8** | **1** | **L3** |
| **b** | **Find the center of curvature at the point P(x,y) of the catenary** **y= ccosh ( ).** |  | **2** | **L4** |
| **8.** | **a** | **If u = 2xy , v = x2 – y2 and x= r cosθ , y = r sinθ , Evaluate**  | **8** | **3** | **L4** |
| **b** | **Evaluate**  |  | **4** | **L4** |
| **9.** | **a** | **Evaluate . ds , where = (x+y2)i – 2xj +2yzk and ‘s’ is the surface of the plane 2x+y+2z= 6 in the first octant.** | **8** | **5** | **L4** |
| **b** | **Find the divF and CurlFof the vector field** **F = xyzi + 3x2yj+(xz2-y2z)k .** |  | **5** | **L3** |

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