Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **19MA1001** | **Duration :** | **3hrs** |
| **Sub. Name :** | **CALCULUS AND LINEAR ALGEBRA** | **Max. Marks :** | **100** |

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| **Q. No.** | **Questions** | **Course**  **Outcome** | **Marks** |
| **PART – A (10 X 1 = 10 MARKS)** | | | |
| 1. | Define skew-symmetric matrix. | CO1 | 1 |
| 2. | Find Eigen values of | CO1 | 1 |
| 3. | What is monotonic sequence? | CO2 | 1 |
| 4. | Geometric series  converges for \_\_\_\_\_\_\_\_\_\_. | CO2 | 1 |
| 5. | Define root mean square value of a function f(x). | CO3 | 1 |
| 6. | Find bn in the expansion of cosx as Fourier series in (-π,π). | CO3 | 1 |
| 7. | Define the Fourier transform of f(x). | CO3 | 1 |
| 8. |  | CO3 | 1 |
| 9. | Evaluate | CO4 | 1 |
| 10. | Change the order of integration | CO4 | 1 |

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| **PART – B (6 X 3 = 18 MARKS)** | | | |
| 11. | Find the characteristic equation of . | CO1 | 3 |
| 12. | Examine the convergence of the series | CO2 | 3 |
| 13. | Define Fourier series and write the Euler’s constant. | CO3 | 3 |
| 14. | Find the Fourier Sine transform of in | CO4 | 3 |
| 15. | Evaluate | CO5 | 3 |
| 16. | Show that  is solenoidal. | CO6 | 3 |

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| **PART – C (6 X 12 = 72 MARKS)**  **(Answer any five Questions from Q.no 17 to 23. Q.No 24 is a Compulsory Question)** | | | | |
| 17. |  | Verify Cayley-Hamilton theorem for the matrix A =  and hence find | CO1 | 12 |
| 18. | a. | Show that the P-series    is (i) Convergent for  ii) Divergent for | CO2 | 6 |
| b. | Test for convergence, the series | CO2 | 6 |
| 19. |  | Compute the first three harmonic for the following data.   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | x0 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 330 | 360 | | f(x) | 7.9 | 8.0 | 7.2 | 5.6 | 3.6 | 1.7 | 0.5 | 0.2 | 0.9 | 2.5 | 4.7 | 6.8 | | CO3 | 12 |
| 20. | a. | Find the Fourier transform of | CO3 | 6 |
| b. | Find the Fourier Cosine transform of | CO3 | 6 |
| 21. | a. | Find the area of the plate in the form of a quadrant of the ellipse | CO4 | 8 |
| b. | Evaluate | CO4 | 4 |
| 22. |  | Diagonalise the matrix A =  by means of an orthogonal transformation. | CO1 | 12 |
| 23. |  | Find the Fourier series of | CO3 | 12 |
|  | | **Compulsory:** | |  |
| 24. |  | Verify Green’s theorem for  where c is bounded by and . | CO6 | 12 |