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



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

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| **Code :** | **18MA1002** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MULTIVARIABLE CALCULUS AND LINEAR ALGEBRA** | **Max. Marks :** | **100** |

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| **Q. No.** | **Questions** | **Course Outcome** | **Marks** |
| **PART – A (10X1 = 10 MARKS)** | | | |
| 1. | Find the value of | CO1 | 1 |
| 2. | Define Beta function. | CO1 | 1 |
| 3. | Check the convergence of sequence | CO2 | 1 |
| 4. | Express f(x) as a half range Fourier cosine series in the interval 0 < x < 1. | CO2 | 1 |
| 5. | If f(x) is an even function then what are the values of | CO3 | 1 |
| 6. | What is the value of div. | CO5 | 1 |
| 7. | Define an irrotational vector. | CO5 | 1 |
| 8. | State Green’s Theorem. | CO5 | 1 |
| 9. | Find the rank of the matrix | CO6 | 1 |
| 10. | Define rank of a matrix. | CO6 | 1 |

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| **PART – B (6 X 3 = 18 MARKS)** | | | |
| 11. | Define the surface of revolution. | CO1 | 3 |
| 12. | Show that the sequence converges. | CO2 | 3 |
| 13. | State Dirichlet’s conditions. | CO2 | 3 |
| 14. | Find a unit vector normal to the surface  at the point (-1,-1,2). | CO5 | 3 |
| 15. | Evaluate | CO4 | 3 |
| 16. | Find the sum and product of the eigen values of | 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. |  | Show that the evolute of the parabola  is | CO1 | | | 12 |
|  |  |  |  | | |  |
| 18. |  | Examine for convergence the series (i)  (ii) | CO2 | | | 12 |
|  |  |  |  | | |  |
| 19. |  | Prove the relation between beta and gamma functions: | CO3 | | | 12 |
|  |  |  |  | | |  |
| 20. |  | Obtain the Fourier series expansion of | CO2 | | | 12 |
|  |  |  |  | | |  |
| 21. | a. | Find the directional derivative of  at the point (2,-1,1) in the direction of the vector | CO5 | | | 8 |
| b. | Evaluate  at the point (1,2,3) given | CO5 | | | 4 |
|  |  |  |  | | |  |
| 22. |  | Evaluate  over the area between and y = x. | CO4 | | | 12 |
|  |  |  |  | | |  |
| 23. |  | Verify Cayley Hamilton theorem for the matrix  and hence find the inverse. | CO6 | | | 12 |
|  | | **Compulsory:** | | | | |
| 24. |  | Find the eigen values and eigen vectors of the matrix A = | | CO6 | 12 | |