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



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

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| **Code :** | **18MA1005** | **Duration :** | **3hrs** |
| **Sub. Name :** | **BASICS OF CALCULUS AND LINEAR ALGEBRA** | **Max. Marks :** | **100** |

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| **Q. No.** | **Questions** | **Course Outcome** | **Marks** |
| **PART – A (1 0 X 1 = 10 MARKS)** | | | |
| 1. | Find the determinant of the matrix | CO1 | 1 |
| 2. | Find the rank of the matrix . | CO1 | 1 |
| 3. | If the eigen values of the matrix A are 2,3,4, then eigen values of are \_\_\_\_\_. | CO1 | 1 |
| 4. | State Cayley-Hamilton Theorem. | CO1 | 1 |
| 5. | Div = . | CO4 | 1 |
| 6. | If then | CO4 | 1 |
| 7. | find | CO5 | 1 |
| 8. | Find for . | CO5 | 1 |
| 9. | Evaluategiven . | CO3 | 1 |
| 10. | If , then = . | CO3 | 1 |

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| **PART – B (6 X 3 = 18 MARKS)** | | | |
| 11. | If  , find the value of . | CO1 | 3 |
| 12. | Find the sum and product of the eigen values of | CO1 | 3 |
| 13. | Find , where . | CO5 | 3 |
| 14. | Check whether the following vectors are linearly independent or dependent:  (1,1,2), (2,2,4), (2,1,2) | CO5 | 3 |
| 15. | If , find. | CO3 | 3 |
| 16. | Evaluate | 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. |  | Solve the equations using  (i) Cramer’s rule (ii) Matrix inversion method. | CO1 | 12 |
|  |  |  |  |  |
| 18. | a. | Verify Cayley-Hamilton theorem for the matrix and hence compute | CO1 | 12 |
|  |  |  |  |  |
| 19. | a. | Find the values of a and b such that the surfaces  and  cut orthogonally at (1,-2,2). | CO4 | 6 |
| b. | Find the directional derivative of  at the point P(1,2,3) in the direction of the line PQ where Q is the point (5,0,4). Also Calculate the magnidute of the maximum directional derivative. | CO4 | 6 |
|  |  |  |  |  |
| 20. | a. | Calculate the area of the triangle whose vertices are . | CO5 | 6 |
| b. | Find the curvature of the ellipse . | CO4 | 6 |
|  |  |  |  |  |
| 21. | a. | Show that has a maximum when . | CO3 | 6 |
| b. | If , show that Jacobian of with respect to  is 4. | CO3 | 6 |
| 22. |  | Find the eigen values and eigen vectors of the matrix | CO1 | 12 |
|  |  |  |  |  |
| 23. | a. | Using Gauss Jordan method, find the inverse of the matrix | CO1 | 9 |
| b. | If ,, compute AB and BA and show that | CO1 | 3 |
|  |  | **Compulsory:** | | |
| 24. | a. | Given , evaluate . | CO6 | 6 |
| b. | Evaluate  Question No.24 from Module 6 | CO6 | 3 |
| c. | Evaluate | CO6 | 3 |