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

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**End Semester Examination – Nov/Dec– 2018**

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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(10X1=10 MARKS)** | | |
| 1. | If A = and B= find AB. | CO1 | 1 |
| 2. | Find the value of Δ =. | CO1 | 1 |
| 3. | If the eigen values of the matrix A are 5 ,-3,2 then the determinant of A is \_\_\_\_\_\_\_\_\_\_\_. | CO1 | 1 |
| 4. | Write the matrix corresponding to the quadratic form | CO2 | 1 |
| 5. | grad f = \_\_\_\_\_\_\_\_\_\_\_. | CO4 | 1 |
| 6. | Define the divergence of the vector function. | CO4 | 1 |
| 7. | Define scalar product. | CO5 | 1 |
| 8. |  | CO5 | 1 |
| 9. |  | CO3 | 1 |
| 10. | Find | CO3 | 1 |

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| **PART B (6 X 3= 18 MARKS)** | |  |  |
| 11. | Determine the rank of the matrix . | CO1 | 3 |
| 12. | Find the eigen values of the matrix. | CO1 | 3 |
| 13. | Prove that **R**, where **.** | CO5 | 3 |
| 14. | If **A** = 4 +3 +, **B**=2-  +2 , find a unit vector **N** perpendicular to vectors **A** and **B**. | CO5 | 3 |
| .15. | If ,show that | 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. | a. | Using Gauss Jordan method , find the inverse of the matrix A= | CO1 | 7 |
| b. | Solve the equation by using Cramer’s rule x+3y+6z=2;3x-y+4z=9; x-4y+2z=7. | CO1 | 5 |
|  |  |  |  |  |
| 18. | a. | Verify Cayley-Hamilton theorem for the matrix A =. | CO1 | 5 |
| b. | Reduce the quadratic form  to the canonical form. | CO2 | 7 |
|  |  |  |  |  |
| 19. | a. | If **R ,** find u. | CO4 | 7 |
| b. | Find the directional derivative of  at the point(1,1,1) in the direction of the line | CO4 | 5 |
|  |  |  |  |  |
| 20. | a. | Find the curvature of the ellipse  . | CO4 | 7 |
| b. | In a triangle ABC; D,E,F are the mid points of the sides BC,CA,AB; prove that | CO5 | 5 |
|  |  |  |  |  |
| 21. | a. | Show that is a maximum when | CO3 | 7 |
| b. | If , prove that | CO3 | 5 |
|  |  |  |  |  |
| 22. | a. | Solve the equations by using matrix inversion method . | CO1 | 7 |
| b. | Express the matrix as the sum of a symmetric and a skew-symmetric matrix. | CO1 | 5 |
|  |  |  |  |  |
| 23. | a. | If A= , find the modal matrix P. | CO2 | 7 |
| b. | Find the characteristic equation of the matrix A= and hence compute | CO1 | 5 |
| **Compulsory:** | | | |  |
| 24. | a. | Given evaluate | CO6 | 6 |
| b. | Evaluate | CO6 | 3 |
| c. | Evaluate the integral | CO6 | 3 |