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

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

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| **Code :** | **18MA1010** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MATRICES AND CALCULUS** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Course**  **Outcome** | **Marks** |
|  | **PART-A(10X1=10 MARKS)** | | |
| 1. | If 3 is an eigenvalue of , then find the eigenvalue of . | CO1 | 1 |
| 2. | Define Index of the quadratic form. | CO1 | 1 |
| 3. | = \_\_\_\_\_\_\_\_. | CO2 | 1 |
| 4. | Write down the formula for radius of curvature of the cartesian curve | CO3 | 1 |
| 5. | If , then \_\_\_\_\_\_\_\_. | CO3 | 1 |
| 6. | What is the necessary condition for to have a minimum? | CO3 | 1 |
| 7. | If , then  is equal to \_\_\_\_\_\_\_\_. |  | 1 |
| 8. | The value of \_\_\_\_\_\_\_\_. | CO4 | 1 |
| 9. | Evaluate. |  | 1 |
| 10. | What is the formula for area enclosed by the plane curves which is given in polar form? | CO6 | 1 |

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| **PART B (6 X 3= 18 MARKS)** | | | |
| 11. | Find the eigenvalues of the matrix  . | CO1 | 3 |
| 12. | Prove that | CO2 | 3 |
| 13. | If then find . | CO3 | 3 |
| 14. | Express the integral in terms of gamma function. | CO4 | 3 |
| 15. | Evaluate . | CO5 | 3 |
| 16. | Find the value of the integral | CO5 | 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. | Find the eigenvalues and eigenvectors of the matrix A= . | CO1 | 8 |
| b. | Verify the Cayley-Hamilton theorem for the matrix . | CO1 | 4 |
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| 18. | a. | Prove that | CO2 | 6 |
| b. | Show that the radius of curvature at any point of the cycloid  is | CO3 | 6 |
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| 19. |  | Expand in powers of andusing Taylor’s theorem. | CO3 | 12 |
|  |  |  |  |  |
| 20. | a. | Find the value of the integral by using partial fractions. | CO5 | 8 |
| b. | Evaluate . | CO5 | 4 |
|  |  |  |  |  |
| 21. | a. | Evaluate over the cardioid above the initial line. | CO5 | 6 |
| b. | Show that the area between the parabolas  and is . | CO6 | 6 |
|  |  |  |  |  |
| 22. | a. | Reduce the matrix to its diagonal form. Also find the modal matrix. | CO1 | 6 |
| b. | Find the canonical form corresponding to the quadratic form . | CO1 | 6 |
|  |  |  |  |  |
| 23. |  | Find the coordinates of the centre of curvature at any point of the parabola . Hence show that its evolute is . | CO3 | 12 |
| **Compulsory:** | | | |  |
| 24. | a. | Evaluate | CO5 | 6 |
| b. | Find by triple integration, the volume of the sphere . | CO6 | 6 |