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

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

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| **Code :** | **11MA201/ 12MA201/ MA244** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ALGEBRA, DIFFERENTIAL CALCULUS AND ANALYTICAL GEOMETRY** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | Irrational roots occur in \_\_\_\_\_\_\_. | 1 |
| 2. | What is the sum of all the roots of the equation | 1 |
| 3. | If A =, find the Eigen values of 2A. | 1 |
| 4. | State Cayley – Hamilton theorem. | 1 |
| 5. | If are the direction cosines of any line then *\_\_\_\_\_\_.* | 1 |
| 6. | Find the direction cosines of the join of P (2, 3, -4) and Q (3, 4, 2). | 1 |
| 7. | The curvature of a straight line is \_\_\_\_\_\_\_\_\_\_. | 1 |
| 8. | The locus of centre of curvature of a curve is called \_\_\_\_\_\_\_. | 1 |
| 9. | If , then find . | 1 |
| 10. | \_\_\_\_\_\_\_ method is used for constrained maxima and minima | 1 |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11. | Transform the equation x4 – 5x3 + 7x2 – 4x +5 =0 by diminishing each of the roots by 2. | 3 |
| 12. | Find the matrix of the Quadratic form | 3 |
| 13. | Find the angle between the planes 2x-y+z = 6 and x+y+2z = 3. | 3 |
| 14. | State the center of curvature for y = f(x). | 3 |
| 15. | Find  if *x3 + y3 = 3ax2y* . | 3 |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. | a. | Solve x3 -14x2 +56x-64 = 0 given that the roots are in G.P. | 7 |
| b. | If are the roots of the equation find the value of | 8 |
| (OR) | | | |
| 17. | a. | Solve  given that it has two pairs of equal roots. | 8 |
| b. | Solve | 7 |
| 18. | a. | Find the Eigen values and Eigen vectors of the matrix . | 8 |
| b. | Using Cayley-Hamilton theorem find A-1 if A = . | 7 |
| (OR) | | | |
| 19. | a. | Reduce the Quadratic form to Canonical form  by orthogonal reduction and state its nature. | 15 |
| 20. | a. | Find the equation of the plane passing through the point (1, 2, –1) and perpendicular to the planes x+y–2z=5 and 3x–y+4z=12. | 7 |
| b. | Find the length and the equation of the shortest distance between the lines  . | 8 |
| (OR) | | | |
| 21. | a. | Show that the lines  and  are coplanar and  find the equation of the plane in which they lie. | 8 |
| b. | Find the image of the point (1,-1,0) in the plane x + y - z = 6. | 7 |
| 22. |  | Find the evolute of the parabola | 15 |
| (OR) | | | |
| 23. |  | Find the radius of the curvature at any point (a cos3θ, a sin3θ) on the curve . | 15 |
| 24. | a. | If  find the value of the Jacobian | 8 |
| b. | Expand upto second degree using Taylor’s theorem. | 7 |
| (OR) | | | |
| 25. |  | A rectangular box, open at the top, is to have a given quantity of 32cc. Find the dimensions of the box which requires least material for its construction. | 15 |