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**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

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

**End Semester Examination – Nov/Dec - 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **11MA206/12MA207/MA210/MA253** | **Duration :** | **3 hrs** |
| **Sub. Name:** | **Mathematical Foundation / Special Mathematics** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | The real part of  is \_\_\_\_\_\_\_ | (1) |
| 2. | If z=2+3i find  . | (1) |
| 3. | **Find the product of the Eigen values of A =** | (1) |
| 4. | Find the rank of the matrix | (1) |
| 5. | Write the formula to find radius of curvature in polar form. | (1) |
| 6. | If  then find . | (1) |
| 7. | Solve =0. | (1) |
| 8. | Find the particular integral of . | (1) |
| 9. | The vector point function is said to be solenoidal if = \_\_\_\_\_\_\_\_\_. | (1) |
| 10. | If , find the value of curl . | (1) |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11 | Express cos4θ in terms of cos θ. | (3) |
| 12 | Show that the vectors X1 =(2,3,0), X2=(1,2,0), X3= (8,13,0) are linearly dependent . | (3) |
| 13 | Find the radius of curvature of  at the point (0,1). | (3) |
| 14 | Find the particular integral of | (3) |
| 15 | If , find grad at (2,0,2). | (3) |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. | a. | Expand in powers of sinθ. | (8) |
| b. | If sin(A+iB) =x+iy, then prove that  and . | (7) |
| (OR) | | | |
| 17. | a. | Prove that = . | (7) |
| b. | Expand in a series of sines of multiples of θ. | (8) |
| 18. | a. | Find the Eigen values and Eigen vectors of the matrix A= | (15) |
| (OR) | | | |
| 19. | a. | Verify the Cayley Hamilton theorem and find A-1 if A = | (15) |
| 20. | a. | Find the equation of circle of curvature of the curve at the point . | (15) |
| (OR) | | | |
| 21. | a. | Find the curvature for the curve y= c . | (7) |
| b. | Find the radius of curvature for r = a (1 + cosθ). | (8) |
| 22. | a. | Solve the equation = 8. | (15) |
| (OR) | | | |
| 23. | a. | Solve | (8) |
| b. | Solve | (7) |
| 24. | a. | Find the angle between the surfaces  and  at ( 2,-1,2 ) | (7) |
| b. | Find the directional derivative of  at  in the direction of . | (8) |
| (OR) | | | |
| 25. | a. | Prove that  is solenoidal as well as irrotational. | (10) |
| b. | If , then find divergence of at (0,1,1) | (5) |

ALL THE BEST