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

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

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| **Code :** | **18MA1003** | **Duration :** | **3hrs** |
| **Sub. Name :** | **CALCULUS AND DIFFERENTIAL EQUATION** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Course**  **Outcome** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | | |
| 1. | In the p-series  diverges if \_\_\_\_\_\_\_\_. | CO2 | 1 |
| 2. | Examine the convergence of the sequence . | CO2 | 1 |
| 3. | =\_\_\_\_\_\_\_. | CO1 | 1 |
| 4. | Surface area of the solid generated by the revolution about the x-axis is \_\_\_\_\_\_\_\_\_. | CO1 | 1 |
| 5. | If  in , then the Fourier coefficient is \_\_\_\_\_\_\_\_. | CO2 | 1 |
| 6. | In a harmonic analysis, the mean value of a function  over the range (a, b) is \_\_\_\_\_\_\_\_\_\_. | CO2 | 1 |
| 7. | If , then = \_\_\_\_\_\_\_. | CO6 | 1 |
| 8. | If , then =\_\_\_\_\_\_\_\_\_\_\_. | CO6 | 1 |
| 9. | = \_\_\_\_\_\_\_\_\_. | CO1 | 1 |
| 10. | =\_\_\_\_\_\_\_\_\_\_\_. | CO1 | 1 |

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| **PART B (6 X 3= 18 MARKS)** | | | |
| 11. | Test the convergence of the series . | CO2 | 3 |
| 12. | Prove that . | CO1 | 3 |
| 13. | If  in , find the Fourier coefficient of . | CO2 | 3 |
| 14. | Find the directional derivative of at the point (2, -1, 1) in the direction of the vector I+2J+2K. | CO5 | 3 |
| 15. | Calculate  over the area included between the circles and . | CO1 | 3 |
| 16. | Solve . | 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. | | Prove that the exponential series  is convergent for all values of x. | CO2 | 6 |
| b. | | State and prove the convergence of Geometric Series. | CO2 | 6 |
|  |  | |  |  |  |
| 18. | a. | | State and Prove the relation between Beta and Gamma Function. | CO1 | 8 |
| b. | | Evaluate . | CO1 | 4 |
|  |  | |  |  |  |
| 19. |  | | Obtain the first three coefficients in the Fourier cosine series for y, where y is given in the following table;  x: 0 1 2 3 4 5  y: 4 8 15 7 6 2 | CO2 | 12 |
|  |  | |  |  |  |
| 20. | a. | | If and  find . | CO6 | 6 |
| b. | | Examine the following function for extreme values : | CO3 | 6 |
|  |  | |  |  |  |
| 21. |  | | Verify Divergence theorem for  taken over the rectangular parallelepiped | CO5 | 12 |
|  |  | |  |  |  |
| 22. |  | | Obtain the Fourier series for  in . Using the two values of y, show that . | CO2 | 12 |
|  |  | |  |  |  |
| 23. |  | | Change the order of integration in and hence evaluate. | CO1 | 12 |
| **Compulsory:** | | | | |  |
| 24. | | a. | Solve . | CO6 | 6 |
| b. | Solve . | CO6 | 6 |