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



**End Semester Examination – Nov / Dec – 2019**

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

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| **Q. No.** | **Questions** | **Course**  **Outcome** | **Marks** | |
| **PART – A (10X1 = 10 MARKS)** | | | | |
| 1. | Examine the convergence of the series. | CO2 | 1 | |
| 2. | Test the convergence of the sequence. | CO2 | 1 | |
| 3. | =\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | CO1 | 1 | |
| 4. | The surface area of the solid generated by the revolution about x-axis of the curve y=f(x) from x=a to x=b is \_\_\_\_\_\_\_ | CO1 | 1 | |
| 5. | If  in, then the Fourier coefficient is \_\_\_\_\_\_\_\_. | CO2 | 1 | |
| 6. | Define Root Mean Square Value. | CO2 | 1 | |
| 7. | If, then = \_\_\_\_\_\_\_\_\_\_\_. | CO6 | 1 | |
| 8. | If, then =\_\_\_\_\_\_\_\_\_\_\_. | CO6 | 1 | |
| 9. | = \_\_\_\_\_\_\_\_\_\_\_\_. | CO1 | 1 | |
| 10. | =\_\_\_\_\_\_\_\_\_\_\_. | CO1 | 1 | |
| **PART – B (6 X 3 = 18 MARKS)** | | | | |
| 11. | Test the convergence of the series. | CO2 | | 3 |
| 12. | Prove that. | CO1 | | 3 |
| 13. | If  in  then 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 | CO6 | | 3 |
| 15. | Prove that, where  is semi circle  above initial line. | 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. | Test for the convergence of the series. | CO2 | 6 |
| b. | Show that the p-series  i) Converges for  and ii) Diverges for. | 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 series for y, where y is given in the following table.   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | x | 0 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 330 | | y | 1.8 | 1.1 | 0.3 | 0.16 | 1.5 | 1.3 | 2.16 | 1.25 | 1.3 | 1.52 | 1.76 | 2 | | CO2 | 12 |
|  |  |  |  |  |
| 20. | a. | If,, , show that . | CO6 | 6 |
| b. | Find the maxima and minima for the function. | CO3 | 6 |
|  |  |  |  |  |
| 21. |  | Change the order of integration in and hence evaluate. | CO1 | 12 |
|  |  |  |  |  |
| 22. |  | Obtain the Fourier series for  in. Using the two values of y, show that. | CO2 | 12 |
|  |  |  |  |  |
| 23. |  | Verify Gauss Divergence theorem for  taken over the cube, , , , , . | CO5 | 12 |
|  |  | **Compulsory:** |  |  |
| 24. | a. | Solve. | CO6 | 6 |
| b. | Solve. | CO6 | 6 |