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



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

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code :** | **19MA1002** | **Duration :** | **3hrs** |
| **Sub. Name :** | **CALCULUS AND LAPLACE TRANSFORM** | **Max. Marks :** | **100** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Q. No.** | **Questions** | **Course Outcome** | **Marks** |
| **PART – A (10 X 1 = 10 MARKS)** | | | |
| 1. | State Roll’s Theorem. | CO1 | 1 |
| 2. | Find the value of . | CO4 | 1 |
| 3. | Write down the linearity property of Laplace transform. | CO2 | 1 |
| 4. |  | CO2 | 1 |
| 5. | If , then | CO3 | 1 |
| 6. | What is the necessary condition for  to have maximum? | CO1 | 1 |
| 7. | Evaluate . | CO4 | 1 |
| 8. | Write down the formula for area enclosed by plane curves whose equations are in polar form. | CO4 | 1 |
| 9. | Find , given . | CO5 | 1 |
| 10. | If , then = | CO5 | 1 |

|  |  |  |  |
| --- | --- | --- | --- |
| **PART – B (6 X 3 = 18 MARKS)** | | | |
| 11. | Express in terms of gamma function. | CO4 | 3 |
| 12. | Find | CO2 | 3 |
| 13. | If  and , find . | CO3 | 3 |
| 14. | Evaluate | CO4 | 3 |
| 15. | Find the directional derivative of at the point (2,-1,1) in the direction of . | CO5 | 3 |
| 16. | If evaluate where C is the curve in the xy-plane from (0,0) to (1,2). | CO5 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **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. |  | Prove that . | CO4 | 12 |
| 18. | a. | Find the Laplace transform of the function defined as | CO2 | 6 |
|  | b. | Evaluate | CO2 | 6 |
| 19. |  | Expand in powers of x and y upto terms of third degree. | CO3 | 12 |
| 20. |  | Change the order of integration in and hence evaluate. | CO4 | 12 |
| 21. | a. | Find the angle between the surfaces and  at the point (2,-1,2). | CO5 | 6 |
| b. | If , prove that grad u, grad v and grad w are coplanar. | CO5 | 6 |
| 22. | a. | If , show that Jacobian of with respect to  is 4. | CO3 | 6 |
|  | b. | Discuss the maxima and minima of | CO1 | 6 |
| 23. | a. | Evaluate | CO4 | 8 |
|  | b. | Find by triple integration, the volume of the sphere . | CO4 | 4 |
|  |  | **Compulsory:** | | |
| 24. |  | Verify Divergence theorem for taken over the rectangular parallelepiped | CO5 | 12 |