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

G:\logo and QP Template\logo 3 Feb 2018 final.tif

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

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code :** | **18MA1004** | **Duration :** | **3hrs** |
| **Sub. Name :** | **CALCULUS, MATRICES AND VECTOR SPACES** | **Max. marks :** | **100** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Q. No.** | **Questions** | **Course**  **Outcome** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | | |
| 1. | Define evolute. | CO1 | 1 |
| 2. | = \_\_\_\_\_\_\_\_\_. | CO1 | 1 |
| 3. | Examine the convergence of the sequence . | CO3 | 1 |
| 4. | The series , converge for\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | CO3 | 1 |
| 5. | A square matrix is said to be singular if\_\_\_\_\_\_\_\_\_\_\_\_. | CO4 | 1 |
| 6. | If the eigenvalues of A is 1,2,3 then find the eigen values of . | CO4 | 1 |
| 7. | Define the span of the subspace S. | CO5 | 1 |
| 8. | Let U be the subspace of a finite dimensional vector space V, then write the relationship between dim U and dim V. | CO5 | 1 |
| 9. | Find if . | CO5 | 1 |
| 10. | If . Find . | CO5 | 1 |

|  |  |  |  |
| --- | --- | --- | --- |
| **PART B (6 X 3= 18 MARKS)** | | | |
| 11. | Express  in terms of gamma functions. | CO1 | 3 |
| 12. | Test the convergence of the exponential series  for all values of x. | CO3 | 3 |
| 13. | Find the sum and product of the eigen values of . | CO4 | 3 |
| 14. | Check whether the following set of vectors are linearly independent or linearly dependent | CO5 | 3 |
| 15. | Find the directional derivatives of at (2,-1,1) in the direction of vector . | CO6 | 3 |
| 16. | Define an inner product space and an Euclidean space of a vector space V. | 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 | CO1 | 12 |
|  |  |  |  |  |
| 18. | a. | Test the convergence of the series . | CO3 | 6 |
| b. | Test the convergence of the series . | CO3 | 6 |
| 19. |  | Reduce the matrix  to the diagonal form. | CO4 | 12 |
|  |  |  |  |  |
| 20. | a. | Prove that the set  is a basis for . | CO5 | 6 |
| b. | Let be a linear map defined by . Verify that . | CO6 | 6 |
|  |  |  |  |  |
| 21. | a. | Find the angle between the surfaces and at the point (2,-1,2). | CO5 | 6 |
| b. | Find and where | CO5 | 6 |
|  |  |  |  |  |
| 22. | a. | Solve by using Cramer’s rule . | CO4 | 6 |
| b. | Using Gauss-Jordan method, find the inverse of the matrix . | CO4 | 6 |
|  |  |  |  |  |
| 23. | a. | Find the surface area of the solid generated by the revolution of the asteroid  about y-axis. | CO2 | 6 |
| b. | Evaluate | CO2 | 6 |
| **Compulsory:** | | | |  |
| 24. | a. | Find an orthonormal basis of  starting from the basis , using the inner product | CO5 | 8 |
| b. | For any two vectors and in an inner product space , Prove that | CO5 | 4 |