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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

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

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

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **15PH3004** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MATHEMATICAL PHYSICS I** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | If r = t2 **i** – t **j** + (2t+1)**k** and s= (2t-3) **i** + **j** – t **k** find the following differentiations at t =1  i.  ii. | CO1 | **10** |
| b. | Verify Stoke’s theorem for a vector field  in the rectangular region of  plane bounded by the lines . | CO1 | **10** |
| **(OR)** | | | | |
| 2. | a. | If  and v = 2z2y – xy2 find ∇ (u +v) and ∇ (uv) at the point (1, 0, 2) | CO1 | **10** |
| b. | Verify divergence theorem for  over the cube bounded by | CO1 | **10** |
| 3. | a. | Compute the adjoint of and verify *(adj A)A =* | CO1 | **10** |
|  | b. | Solve by Cramer’s rule the system of equations  *x - 2y + 3z =9*  *2y + z = 0*  *-x + 2z = 3* | CO1 | **10** |
| **(OR)** | | | | |
| 4. |  | Verify Cayley Hamilton’s theorem for . Hence evaluate  and find . | CO1 | **20** |
| 5. |  | Prove that, the sum of two or more tensors of the same rank and type is also a tensor of the same rank and type. | CO1 | **20** |
| **(OR)** | | | | |
| 6. |  | If *xy, 2y –z2*and *xz* are the components of a covariant tensor in rectangular coordinates, then find its covariant components in spherical coordinates. | CO1 | **20** |
| 7. | a. | Solve | CO1 | **10** |
|  | b. | Solve | CO1 | **10** |
| **(OR)** | | | | |
| 8. |  | Solve  , the differerntial equation which means that the self induction and capacity in a circuit neutralize each other. Determine the constants in such a way that *I* is the maximum current and *i = 0* when *t = 0* | CO1 | **20** |
|  | | **Compulsory:** |  |  |
| 9. |  | Find the mean deviations from the median and the mean of the following data:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Size of items: | 4 | 6 | 8 | 10 | 12 | 14 | 16 | | Frequency | 2 | 4 | 5 | 3 | 2 | 1 | 4 | | CO1 | **20** |

ALL THE BEST