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

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**End Semester Examination – Nov/Dec – 2017**

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| **Code :** | **17PH3003** | **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. | Evaluate *F = x2* ***i*** *+ y2* ***j*** *+ z2* ***k*** taken over the cube using Gauss divergence theorem. | CO1 | | 10 |
| b. | If then find *div (grad ).* | CO1 | | 10 |
| (OR) | | | | | |
| 2. | a. | If u and v = 2z2y – xy2 find (u +v) and (uv) at the point (1, 0, 2) | CO1 | | 10 |
| b. | Evaluate when ***F*** *= xy* ***i*** *+ yz* ***j*** *+ zx* ***k***, where c is the curve *r = t* ***i*** *+ t2* ***j*** *+ t3* ***k***, t varying form -1 to +1 | CO1 | | 10 |
|  |  |  | |  |
| 3. | a. | Compute the adjoint of and verify *(adj A)A = I* | CO2 | | 10 |
|  | b. | Solve by Cramer’s rule the system of equations  *x - 2y + 3z =9*  *2y + z = 0*  *-x + 2z = 3* | CO2 | | 10 |
| (OR) | | | | | |
| 4. | a. | Verify Cayley Hamilton’s Theorem and hence find the inverse  of the matrix A = | CO2 | | 10 |
|  | b. | Find the Eigen values of the matrix | CO2 | | 10 |
|  |  |  |  | |  |
| 5. | a. | (D2 – 4D + 4)y = 8 sin 2x. | CO4 | | 10 |
|  | b. | Solve . | CO4 | | 10 |
| (OR) | | | | | |
| 6. |  | Solve , the differential 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*. | | CO4 | 20 |
|  |  |  | |  |  |
| 7. |  | Calculate the quartile, the mean and the standard deviation from the following viscosity data:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Temperature | 35-36 | 36-37 | 37-38 | 38-39 | 39-40 | 40-41 | 41-42 | | Viscosity | 14 | 20 | 42 | 54 | 45 | 18 | 7 | | | CO5 | 20 |
| (OR) | | | | | |
| 8. |  | A distribution consists of three components with frequencies 200, 250, 300 having means of 25, 10 and 15, standard deviations of 3,4 and 5 respectively. Show that the mean of the combined distribution is 16 and its standard deviation is 7.2 approximately. Find also the coefficient of variation(CV). | | CO5 | 20 |
|  |  |  | |  |  |
|  | | **Compulsory**: | |  |  |
| 9. |  | If *xy, 2y –z2*and *xz* are the components of a covariant tensor in rectangular coordinates, then find its covariant components in spherical coordinates. | | CO3 | 20 |

ALL THE BEST