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



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

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| **Code :** | **15PH3008** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MATHEMATICAL PHYSICS II** | **Max. marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Obtain the necessary conditions for the function f(z) to be analytic. | CO1 | 8 |
| b. | Prove that the function  is harmonic. | CO1 | 6 |
|  | c. | Expand in Taylor’s series cos z about the point | CO1 | 6 |
| (OR) | | | | |
| 2. | a. | Derive Cauchy’s integral formula. | CO1 | 10 |
| b. | Evaluate  where C is | CO1 | 10 |
| 3. | a. | Using Contour integration,prove that | CO1 | 10 |
|  | b. | Find the residue of  at its poles. | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | Obtain the half-range cosine series for the function  in the interval 0 < x < 1. Hence show that | CO1 | 10 |
|  | b. | Find the Fourier transform of ,    Hence evaluate | CO1 | 10 |
| 5. | a. | The points of trisection of a tightly stretched string of length with fixed ends are pulled aside through a distance ‘d’ on opposite sides of the position of equilibrium and the string is released from rest. Obtain an expression for the displacement of the string at any subsequent time. | CO1 | 20 |
|  |  | (OR) |  |  |
| 6. | a. | Show that the inverse of an element of a subgroup of a group is the same as the inverse of the same element regarded as an element of that group. | CO1 | 10 |
|  | b. | Prove that every group is isomorphic to a group of permutations | CO1 | 10 |
| 7. | a. | Using Newton’s divided difference formula, find  x : 0 2 3 4 7 9  f(x) : 4 26 58 112 466 922 | CO1 | 10 |
|  | b. | Apply Lagrange’s formula to find f(5) given that f(1) = 2, f(2) = 4, f(3) = 8, f(4) = 16 and f(7) = 128. | CO1 | 10 |
| (OR) | | | | |
| 8. | a. | Solve , y(0) = 0 using Picard’s method for x = 0.2 | CO1 | 10 |
|  | b. | Evaluate  by dividing the range into 10 equal parts using i. Trapezoidal rule ii. Simpson’s one third rule. | CO1 | 10 |
|  | | **Compulsory:** |  |  |
| 9. |  | Apply fourth order Runge-Kutta method, to find an approximate value of y when x = 0.2 and x = 0.4 given that | CO1 | 20 |

ALL THE BEST