C 4674

(Pages : 2)

Name.....

Reg. No.....

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, JUNE 2016

(CUCSS)

Physics

PHY2C06—MATHEMATICAL PHYSICS—II

(2012 Admissions)

Time : Three Hours

Maximum : 36 Weightage

Section A

Answer **all** *questions.*
Each question carries a weightage of 1.

1. What are Cauchy-Riemann conditions for analyticity ?
2. Define poles and zeros of a function.
3. Indicate how a simply connected region is converted into a multiply connected region.
4. Give an example for a cyclic group.
5. What is meant by irreducible representation ?
6. Show that the identity element of a group is a class by itself.
7. Explain the concept of variation.
8. Prove the symmetry of Greens function.
9. What is the equation to a plane curve along which a particle acted upon by gravity alone would descent down ?
10. What are Lagrange multipliers ?
11. Explain separable kernals.
12. Define Volterra equations of the first and second kind.

(12 × 1 = 12 weightage)

Section B

Answer any **two** *questions.*
Each question carries a weightage of 6.

13. Obtain the Laurent series expansion of a complex function
14. Explain homomorphism of groups. Establish the homomorphism OF SU(2) and SO(3).
15. Discuss the Neumann series method for the solution of linear integral equations with an example.
16. Obtain the Green's function solution of Poisson's equation.

(2 × 6 = 12 weightage)

Turn over

Section C

Answer any **four** *questions.*
Each question carries a weightage of 3.

17. Find the sum of the residues of the function $f(z) = \frac{\tan z}{z}$.

18. Show that the order of each sub group of a group is a divisor of the order of the group.

19. Integrating over a suitable contour evaluate $\int_0^\infty \frac{\sin x}{x}\, dx$.

20. Find the equation to a line connecting two parallel coaxial wire circles such that the wire revolving about the x-axis produces the minimum surface area.

21. Derive Fredholm equation, corresponding to $y''(x) - y(x) = 0$; $y(1) = 1$, $y(-1) = 1$ by integrating twice.

22. Convert the equation $y'' + \omega^2 y = 0$ to an integral equation.

(4 × 3 = 12 weightage)