

KARIMPUR PANNADEVI COLLEGE

Internal Assessment 2020, Semester – IV

Sub: PHYSICS (Honours)

Paper : HCC-T-8

Full Marks : 20

Answer any ten questions

(10×2 = 20)

1. Write down the Cauchy-Riemann conditions for differentiability of a complex function
2. What is meant by harmonic functions
3. Show that $\sin z$ is an analytic function.
4. Evaluate the integral $\oint \frac{dz}{z-a}$ in the conventional positive sense over any simply closed curve containing $z = a$ inside.
5. State Cauchy's integral formula.
6. Using Cauchy's integral formula prove that

$$\int_C \frac{2z + 1}{z^2 + z} dz \quad \text{where } C \text{ is } |z| = \frac{1}{2}$$

7. State Cauchy's residue theorem.
8. Define Fourier transform.
9. Obtain the Fourier transform of a Gaussian function e^{-at^2} .
10. Represent Dirac delta function as a Fourier integral.
11. What is meant by inverse Fourier transform?

12. Define Laplace transform.
13. What are the Laplace transform of $\cos(kt)$ and $\sin(kt)$?
14. What is the Laplace transform of the Dirac delta function?