MALLA REDDY COLLEGE OF ENGINEERING \& TECHNOLOGY
(Autonomous Institution - UGC, Govt. of India)
II B.Tech I Semester Supplementary Examinations, July/August 2023 Mathematics-III
(EEE \& ECE)

| Roll No |  |  |  |  |  |  |  |  |  |  |
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Time: $\mathbf{3}$ hours
Max. Marks: 70
Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14M marks.

## SECTION-I

A Find a Fourier transform of $f(x)=\left\{\begin{array}{ll}1, & |x|<1 \\ 0, & |x|>1\end{array}\right.$ Hence evaluate $\int_{0}^{\infty} \frac{\sin x}{x} d x$
B Find Fourier transform of $e^{-x^{2}}$
[7M]
OR
Using Fourier integral Show That

$$
\int_{0}^{\infty} \frac{1-\cos \pi \lambda}{\lambda} \operatorname{Sin} \lambda x d \lambda= \begin{cases}\frac{\pi}{2}, & \text { if } 0<x<\pi  \tag{14M}\\ 0, & x>\pi\end{cases}
$$

## SECTION-III

5 A Determine $p$ such that the function

$$
\begin{equation*}
f(z)=\frac{1}{2} \log \left(x^{2}+y^{2}\right)+i \tan ^{-1}(p x / y) \text { be an analytic function. } \tag{7M}
\end{equation*}
$$

B Evaluate $\int_{c} \frac{d z}{z^{3}(z+4)}$ where C is $|\mathrm{z}|=2$ using cauchy's integral formula.
[7M]
OR
6
Evaluate $\int_{c} \frac{z^{2}+1}{z(2 z+1)} d z$ where C is $|z|=1$ using Cauchy's integral formula.

## SECTION-IV

7 Evaluate $\int_{c} \frac{e^{2 z}}{(z-1)(z-2)} d z$ where c is the circle $|\mathrm{z}|=4$ by using Residue Theorem.

OR
8 A Define isolated singular point, pole and essential singularity with suitable an examples.

B State and prove residue theorem.

## SECTION-V

9 A Discuss about the transformation $w=\log z$
B Under the transformation $w=\frac{z-i}{1-i z}$ find the image of the circle $|z|=1$
OR

10 Find the bilinear transformation which maps the points $(\infty, i, 0)$ in the Z-plane into $(-1,-i, 1)$ in the W-plane

