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

| Roll No |  |  |  |  |  |  |  |  |  |  |
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Time: 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 14 marks.

## SECTION - I

1A) Obtain the Fourier series for the function $f(x)=x^{2}$ in $(-\pi, \pi)$ [7M]
1 B) Express $f(x)=1$ as Half range Fourier cosine series in $(0, \pi)[7 M]$
(OR)
2 ) Find the half - range sine series for $\mathrm{f}(\mathrm{x})=\left\{\begin{array}{cl}2 x & ; 0<x<1 \\ 4-2 x & ; 1<x<2\end{array}\right.$

## SECTION - II

3 A) Using Fourier Cosine integral, show that $\int_{0}^{\infty} \frac{\cos \lambda}{a^{2}+\lambda^{2}} d \lambda=\frac{\pi}{2 a} e^{-a x}[7 \mathbf{M}]$
3 B) Find the finite Fourier Sine transform of $f(x)=2 x ; 0<x<4 \quad[7 M]$
(OR)
4) Find Fourier Sine transform of $e^{-a x}, a>0$ Hence deduce inverse transform formula [14M]

SECTION - III
5 A)Find k such that $\mathrm{f}(\mathrm{z})=\mathrm{e}^{\mathrm{x}}($ cosky + isinky $)$ is an analytic function
5 B) Using Integral formula, evaluate $\int \frac{e^{2 z}}{(z-1)(z-2)} d z$ over the circle $|z|=3[7 \mathbf{M}]$

## (OR)

6 A) Find $f(z)$ in terms of $z$ whose real part is $e^{x}$ (xcosy -ysiny ) [7M]
6 B) Evaluate $\int\left[\left(y^{2}+2 x y\right) d x+\left(x^{2}-2 x y\right) d y\right]$ along the boundary of the region Bounded by $y=x^{2}$ and $x=y^{2} \quad[7 M]$

## SECTION - IV

7 A) Expand $f(z)=\frac{5 z+7}{(z+3)(z+2)}$ in the region $|z|<2$
7 B)Using Residue theorem, evaluate $\int \frac{4-3 z}{z(z-1)(z-2)} \mathrm{dz}$ over the circle $|\mathrm{z}|=1.5$ [7M]

## (OR)

8) Using residue theorem, evaluate $\int_{0}^{2 \pi} \frac{\cos 2 \theta}{5+4 \cos \theta} \mathrm{~d} \theta$ using residue theorem.[14M]

## SECTION - V

9 A) Find the image of the circle $|z|=2$ under the transformation $w=2 z \quad$ [7M] 9 B) Find the bilinear transformation which maps the points 1 , i, -1 into the[7M] points i, 0, -i

## (OR)

10 A) Find the image of infinite strip $0<y<\frac{1}{2}$ under the transformation $w=\frac{1}{z}[7 \mathbf{M}]$
10 B) Under the transformation $|w|=1$ find the image of the circle $|z|=1 \quad$ [7M]

