Code No: R20A0023 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)

(EEE & ECE)										
Roll No										

Time: 3 hours

2

4

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

1	А	Obtain the Fourier series for the function $f(x) = \begin{cases} \pi x; & 0 \le x \le 1 \\ \pi (2-x); & 1 \le x \le 2 \end{cases}$	[7M]
	D	Find the helf remove Cosine series for $f(x) = -x$, $x = -x$	[7]

B Find the half range Cosine series for
$$f(x) = \pi - x$$
 in $(0, \pi)$ [7M]
OR

Obtain the Fourier series, if
$$f(x) = \begin{cases} 0, -\pi \le x \le 0\\ \sin x, \le 0 \le x \le \pi \end{cases}$$
 [14M]

SECTION-II

3
A Find a Fourier transform of
$$f(x) = \begin{cases} 1, & |x| < 1 \\ 0, & |x| > 1 \end{cases}$$
 Hence evaluate $\int_{0}^{\infty} \frac{\sin x}{x} dx$ [7M]

OR

B Find Fourier transform of e^{-x^2}

Using Fourier integral Show That

$$\int_{0}^{\infty} \frac{1 - \cos\pi\lambda}{\lambda} \sin\lambda x d\lambda = \begin{cases} \frac{\pi}{2}, & \text{if } 0 < x < \pi \\ 0, & x > \pi \end{cases}$$
SECTION-III

5 A Determine p such that the function

$$f(z) = \frac{1}{2}\log(x^2 + y^2) + i \tan^{-1}(px/y) \text{ be an analytic function.}$$
[7M]

OR

B Evaluate
$$\int_c \frac{dz}{z^3(z+4)}$$
 where C is $|z|=2$ using cauchy's integral formula. [7M]

6

Evaluate
$$\iint_{c} \frac{z^{2}+1}{z(2z+1)} dz$$
 where C is $|z|=1$ using Cauchy's integral [14M] formula.

Page 1 of 2

[14M]

R20

		SECTION-IV	
7		Evaluate $\int_{c} \frac{e^{2z}}{(z-1)(z-2)} dz$ where c is the circle $ z =4$ by using Residue	[14M]
		Theorem.	
		OR	
8	А	Define isolated singular point, pole and essential singularity with suitable an examples.	[7M]
	В	State and prove residue theorem. <u>SECTION-V</u>	[7M]
9	А	Discuss about the transformation $w = \log z$	[7M]
В	Under the transformation $w = \frac{z-i}{1-iz}$ find the image of the circle $ z = 1$		
		OR	
10		Find the bilinear transformation which maps the points (∞ , i,0) in the Z-plane into (-1, -i,1) in the W-plane	[14M]