#### Code No: R18A0023

# MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

### (Autonomous Institution – UGC, Govt. of India)

### II B.Tech I Semester Supplementary Examinations, April 2023

# Mathematics-III

Roll No										

#### Time: 3 hours

**Note:** This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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#### **SECTION – I**

1 A) 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  $(0, \pi)$  [7M]

(OR)

2) Find the half - range sine series for  $f(x) = \begin{cases} 2x & ; 0 < x < 1 \\ 4 - 2x & ; 1 < x < 2 \end{cases}$  [14M]

#### **SECTION – II**

3 A) Using Fourier Cosine integral, show that  $\int_0^\infty \frac{\cos\lambda}{a^2+\lambda^2} d\lambda = \frac{\pi}{2a} e^{-ax}$ [7M] 3 B) Find the finite Fourier Sine transform of f(x) = 2x; 0 < x < 4 [7M]

#### (OR)

4) Find Fourier Sine transform of  $e^{-ax}$ , a > 0 Hence deduce inverse transform formula [14M]

#### **SECTION – III**

5 A)Find k such that  $f(z) = e^{x}(\cosh y + i\sinh y)$  is an analytic function [7M] 5 B) Using Integral formula, evaluate  $\int \frac{e^{2z}}{(z-1)(z-2)} dz$  over the circle |z| = 3[7M] (OR)

6 A) Find f(z) in terms of z whose real part is  $e^x (x \cos y - y \sin y)$  [7M]

6 B) Evaluate  $\int [(y^2 + 2xy)dx + (x^2 - 2xy)dy]$  along the boundary of the region Bounded by  $y = x^2$  and  $x = y^2$  [7M]

#### **SECTION – IV**

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

Max. Marks: 70

(**OR**)

8) Using residue theorem, evaluate  $\int_0^{2\pi} \frac{\cos 2\theta}{5+4\cos \theta} d\theta$  using residue theorem.[14M]

## $\boldsymbol{SECTION-V}$

9 A) Find the image of the circle |z| = 2 under the transformation w = 2z [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  $w = \frac{1}{z} [7M]$ 10 B) Under the transformation |w| = 1 find the image of the circle |z| = 1 [7M]

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