

**I B. Tech I Semester Supplementary Examinations, January - 2020**  
**MATHEMATICS-II (NM&CV)**  
 (Com to ECE, EIE, ECom E)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answering the question in **Part-A** is Compulsory  
 3. Answer any **FOUR** Questions from **Part-B**

**PART -A**

1. a) Explain iteration method. (2M)
- b) Define average operator. (2M)
- c) Write a formula for trapezoidal rule. (2M)
- d) Write the demerits of Picard's method. (2M)
- e) Show that Real parts of an analytic function satisfies Laplace equation. (2M)
- f) If C is a simple closed curve then Evaluate  $\int_C (\sin 3z + z^4 + e^z) dz$ . (2M)
- g) Classify the Singularity of  $f(z) = (z + 1)^2 e^{1/z+1}$  at  $z = -1$ . (2M)

**PART -B**

2. a) Find analytic  $f(z)$  whose real part  $u(x, y) = e^x [(x^2 - y^2) \cos y - 2xy \sin y]$  (7M)
  - b) Show that  $f(z) = \begin{cases} \frac{(x^3 - y^3) + i(x^3 + y^3)}{x^2 + y^2} & \text{if } z \neq 0 \\ 0 & \text{if } z = 0 \end{cases}$  is not analytic at origin (7M)
- although C-R equations are satisfied at the origin.
3. a) Obtain Laurent's expansion for  $\frac{1}{(z^2+1)(z^2+2)}$  in  $1 < |z| < \sqrt{2}$  (7M)
  - b) Evaluate  $\int_c \frac{z}{(z^2+1)} dz$  where  $c : \left|z + \frac{1}{2}\right| = 2$  using Cauchy's integral formula. (7M)
  4. a) Evaluate  $\oint_c \frac{2e^z}{z(z-3)} dz$  Where  $c : |z| = 2$  by Residue theorem. (7M)
  - b) Evaluate  $\int_0^\infty \frac{\cos mx}{x-a} dx$  using residue theorem. (7M)
  5. a) Find  $y(1.2)$  Using RK method given that  $\frac{dy}{dx} = \log(x+y)$ ,  $y(1) = 0$  (7M)
  - b) By Picard's method find  $y(0.4)$  given that  $\frac{dy}{dx} = x^2 + y^2$ ,  $y(0) = 0$  (7M)

6. a) Using Newton forward formula find  $f(2.5)$  from the following table. (7M)

x	0	1	2	3	4	5	6
y	0	1	16	81	256	625	1296

(7M)

- b) Using Lagrange's formula, fit a polynomial to the following data.

X	0	1	3	4
Y	-12	0	6	12

7. a) Find the Real root of  $x^3 - 5x + 3 = 0$  using Bisection method. (7M)

- b) Find the  $1/\sqrt{12}$  using iteration method. (7M)