

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

Time: 3 hours

Max. Marks: 70

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

PART -A

1. a) Find the $\sqrt{17}$ using Newton Raphson method. (2M)
 b) Construct the difference table for the following data. (2M)
- | | | | | |
|---|---|----|----|----|
| x | 0 | 1 | 2 | 3 |
| y | 5 | 12 | 16 | 23 |
- c) Evaluate $\int_0^1 \sin x dx$ using Trapezoidal Rule (taking n = 5) (2M)
 d) Find $Lt_{x \rightarrow 0} \frac{(x+y)^2}{x^2+y^2}$ (2M)
 e) Evaluate $\oint_C \frac{e^z}{z-1} dz$ where C is the circle $|z|=1$ (2M)
 f) Determine the Residue of $f(z) = z \cos \frac{1}{z}$, at $z = 0$ (2M)
 g) Classify the Singularity of $f(z) = (z+1)^2 e^{1/z+1}$ at $z = -1$ (2M)

PART -B

2. a) Find the root of the equation $3x = 1 + \cos x$ using bisection method. (7M)
 b) Find the root of the equation $2x - \log_{10} x = 7$ using Iteration method. (7M)
3. a) Given that $\sin 45^\circ = 0.7077$, $\sin 50^\circ = 0.766$, $\sin 55^\circ = 0.8192$, $\sin 60^\circ = 0.866$ find $\sin 65^\circ$ using Newton's Back ward difference formula. (7M)
 b) Using Newton's backward difference formula find $y(12)$ from the following table. (7M)

X	0	5	10	15	20	25
Y	7	11	14	18	24	32

4. a) Evaluate $\int_1^2 (x^2+1) dx$ by (i) Simpson's 1/3rd rule (ii) Simpson's 3/8th Rule. (7M)
 b) Solve $\frac{dy}{dx} = \frac{xy}{2}$ using Picard's method for $x=1.1$ given $y(1)=1$. (7M)

5. a) if $f(z)$ is an analytic function show that (7M)

$$\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} \right) |\operatorname{Re} f(z)|^2 = 2 |f'(z)|^2$$

- b) Determine analytic function whose real part $u = e^{x^2 - y^2} \cos 2xy$. (7M)

6. a) Evaluate $\oint_c (z + 1) dz$ where c is the boundary of the Square whose vertices are at the points $z=0, z=1, z=1+i, z=i$. (7M)

- b) Find Taylor's expansion $f(z) = \frac{z}{(z+1)(z+2)}$ about the point $z = -2$. (7M)

7. a) Evaluate $\oint_c \frac{2e^z}{z(z-3)} dz$ Where $c : |z| = 2$ by Cauchy's Residue theorem. (7M)

- b) Use the method of contour integration to prove that $\int_0^\pi \frac{\cos 2\theta d\theta}{1+a^2-2a\cos\theta} = \frac{\pi a^2}{1-a^2}$ (7M)
 $,-1 < a < 1$.