

I B. Tech I Semester Supplementary Examinations, May - 2018
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. Answer **ALL** the questions in **Part-A**
 3. Answer any **FOUR** Questions from **Part-B**

PART -A

1. a) Find the $\sqrt{15}$ using Bisection method. (2M)
 - b) Construct the difference table for the following data. (2M)
- | | | | | |
|---|---|----|----|----|
| x | 0 | 5 | 10 | 15 |
| y | 2 | 10 | 23 | 29 |
- c) Evaluate $\int_0^1 x^2 dx$ using Trapezoidal Rule (taking n = 5). (2M)
 - d) Show that the function $f(z)=z$ is continuous. (2M)
 - e) If C is a simple closed curve then evaluate $\int_C (\sin 3z + z^4 + e^z) dz$ (2M)
 - f) Determine the poles of $f(z) = \frac{z^2}{z^4+1}$ (2M)
 - g) Find the singularity of $f(z) = \frac{\sin(z-2)}{z-2}$ at $z = 2$. (2M)

PART -B

2. a) Find the root of the equation $x^3 - x - 4 = 0$ using False position method. (7M)
- b) Find the root of the equation $e^x \sin x = 1$ using Newton Raphson 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 $\sin 48^\circ$ using Newton's forward difference formula. (7M)
- b) Using Gauss Forward difference formula find $y(8)$ from the following table. (7M)

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

4. a) Evaluate $\int_0^{\frac{1}{2}} \frac{dx}{\sqrt{1-x^2}}$ by (i) Simpson's 1/3rd rule (iii) Simpson's 3/8th Rule. (7M)
- b) Solve $\frac{dy}{dx} = xy$ using Modified Euler's method for $x=1.1$ given $y(1)=1$ (7M)

5. a) Prove that $f'(z)$ does not exist at $z=0$ if (7M)

$$f(z) = \begin{cases} \frac{x^3 y(y-ix)}{x^6 + y^2} & \text{if } z \neq 0 \\ 0 & \text{if } z = 0 \end{cases}$$

- b) Determine analytic function whose real part is $u = \frac{\sin 2x}{\cosh 2y - \cos 2x}$ (7M)

6. a) Evaluate $\int_C \frac{e^z}{(z^2 + \pi^2)^2} dz$ where $C: |z| = 4$ using Cauchy's integral formula. (7M)

- b) Expand $f(z) = \frac{1}{z(z^2 - 3z + 2)}$ in $0 < |z| < 1$ using Laurent's expansion. (7M)

7. a) Evaluate $\oint_C \frac{\tan z}{z^2 - 1} dz$ Where $C: |z| = 1.5$ by Cauchy's Residue theorem. (7M)

- b) Evaluate $\int_0^{2\pi} \frac{\cos n\theta}{1 + a^2 + 2a \cos \theta} d\theta$ where n is a positive integer, $0 < a < 1$ (7M)

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