

I B. Tech II Semester Supplementary Examinations, April/May - 2018
MATHEMATICS-II (MM)

(Com. to CE,ME,CSE,PCE,IT,Chem E,Aero E, Auto E,Min E, Pet E,Metal E & Textile 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 **THREE** Questions from **Part-B**

PART -A

1. a) Write the iteration formula to find $\frac{1}{a}$ using Newton Raphson method. (3M)
- b) If the interval of differencing is unity prove that $\Delta \frac{2^x}{x!} = \frac{2^x(1-x)}{(x+1)!}$ (4M)
- c) Evaluate $y(0.1)$ using Euler's method for $\frac{dy}{dx} = xy + e^x$, $y(0) = 1$ (4M)
- d) Write the half range sine series for $f(x) = \frac{x}{a}$ in $(0, \pi)$. (4M)
- e) Write Fourier integral theorem. (3M)
- f) Find $Z(n^3)$. (4M)

PART -B

2. a) Find the Real root of the equation $x \log_{10} x = 1.2$ using bisection method. (8M)
- b) Find the Real root of the equation $x^3 - x - 11 = 0$ using iteration method. (8M)
3. a) Find the missing values in the following table. (8M)

X	0	5	10	15	20	25
Y	6	10	-	17	-	31

- b) Find the interpolating polynomial $f(x)$ from the table. (8M)

X	0	1	4	5
f(x)	4	3	24	39

4. a) Evaluate $y(0.1)$ using modified Euler's method for $\frac{dy}{dx} = y + \frac{2x}{y}$, $y(0) = 1$ (8M)
- b) Evaluate $y(0.1)$ using Taylor's method for $\frac{dy}{dx} = y + x^2$, $y(0) = 1$ (8M)

5. a) Find the Fourier expansion of $f(x) = \begin{cases} 2, & \text{if } -2 < x < 0 \\ x, & \text{if } 0 < x < 2 \end{cases}$ (8M)
- b) Find the half range cosine series of $f(x) = e^{-x}$ $0 < x < 2\pi$ (8M)
6. a) Prove that (i) $F_c\{f(ax)\} = \frac{1}{a} F_c\left(\frac{p}{a}\right)$ (ii) $F_c\left\{f\left(\frac{x}{a}\right)\right\} = aF_c(ap)$ (8M)
- b) Find the Fourier transform of $f(x)$ defined by $f(x) = e^{-\frac{x^2}{2}}$, $-\infty < x < \infty$ (8M)
7. a) Solve the difference equation $y_{n+2} - 6y_{n+1} + 9y_n = 3^n$, $y_0 = 1, y_1 = 3$ using Z-Transform. (8M)
- b) Find $Z[e^n \cos n\theta]$. (8M)