

I B. Tech II Semester Supplementary Examinations, April/May - 2019**MATHEMATICS-II (MM)**

(Com. to CE, ME, CSE, PCE, IT, Chem E, Aero E, Auto E, Min E, Pet E, Metal E & Textile Engg)

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 Compulsory3. Answer any **THREE** Questions from **Part-B****PART -A**

1. a) Find $\frac{1}{\sqrt{10}}$ using Newton Raphson method. (4M)
 - b) Show that $\Delta \nabla = \nabla \Delta = \Delta - \nabla = \delta^2$ (4M)
 - c) Find $y(0.1)$ given that $y' = y - \frac{2x}{y}$, $y(0) = 1$ by Taylor's series method. (4M)
 - d) Find the Fourier series of $f(x) = 2x$ in $(-\pi, \pi)$ (4M)
 - e) Find the Finite Fourier Cosine transform of $f(x)$ defined by (3M)
- $$f(x) = \frac{\pi}{3} - x + \frac{x^2}{2\pi}, \text{ where } 0 < x < \pi$$
- f) Find $Z\left(\frac{1}{n}\right)$ (3M)

PART -B

2. a) Find the Real root of the equation $x^3 + 2x^2 + 10x - 20 = 0$ using Bisection method. (8M)
- b) Find the Real root of the equation $x = \cos x$ using Iteration method. (8M)
3. a) Find $f(5)$ using the data $(1,-5), (2,1), (3,9), (4,12)$. (8M)
- b) Find the polynomial satisfied by $(-4, 1245), (-1, 33), (0, 5), (2, 9), (5, 1335)$. (8M)
4. a) Find $y(1)$ given that $y' = xy$, $y(0.5) = 1$ by modified Euler's method. (8M)
- b) Find $y(0.2)$ given that $y' = \frac{x-y}{2}$, $y(0) = 1$ by RK method of fourth order. (8M)
5. a) Find the half range sine series $f(x) = \begin{cases} -\pi, & 0 < x < 1 \\ x, & 1 < x < 2 \end{cases}$ (8M)
- b) Find the Fourier series for $f(x) = \begin{cases} x, & -\frac{\pi}{2} < x < \frac{\pi}{2} \\ 0, & \frac{\pi}{2} < x < \frac{3\pi}{2} \end{cases}$ (8M)

$$\text{Hence deduce that } \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = \frac{\pi^2}{8}$$

6. a) Find the Finite Fourier Cosine transform of $f(x)$ defined by (8M)

$$f(x) = \begin{cases} 1 & 0 < x < 1 \\ -1 & 1 < x < 2 \end{cases}$$

- b) Find inverse Fourier sine transform of $\frac{1}{p} e^{-ap}$ (8M)

7. a) State and prove initial value theorem in z-transforms. (8M)

- b) Find the $Z^{-1} \left[\frac{z^3 - 20z}{(z-2)^3(z-4)} \right]$ (8M)