

I B. Tech I Semester Supplementary Examinations, May - 2018
MATHEMATICS-II (MM)
 (Com. to CSE, IT, Agri 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) Write the working rule to find the root of $f(x) = 0$ by Newton Raphson method. (2M)
- b) Prove that $E = e^{hD}$ (2M)
- c) Find $y(0.2)$ by RK method of second order given that $\frac{dy}{dx} = x^2 - xy$, $y(0) = 1$ (2M)
- d) Find half range sine series of $f(x) = \frac{1}{2}$ in $[0,2]$ (2M)
- e) Find the inverse Fourier finite sine transform of $f(x)$ if (2M)
 $F_s(n) = \frac{2\pi(-1)^n}{n^3}$ in $(0, \pi)$
- f) Find the Fourier transform of $f(x) = \begin{cases} 1 & \text{if } 0 < x < 1 \\ 0 & \text{if } 1 < x < 2 \end{cases}$ (2M)
- g) What are the initial conditions in one dimension wave equation? (2M)

PART -B

2. a) Find the root of the equation $x^3 - x - 11 = 0$ using False position method. (7M)
- b) Find the root of the equation $x^4 - x - 10 = 0$ using Iteration method. (7M)
3. a) Find the Lagrange's polynomial for the following data. (7M)

x	0	1	2	5
y	2	3	12	14

- b) Using Newton's Forward difference formula find $y(2)$ from the following table. (7M)

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

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

5. a) Find the Fourier series of $f(x) = \begin{cases} 0, & -\pi < x < 0 \\ 1, & 0 < x < \pi \end{cases}$ (7M)

Hence deduce that $1 - \frac{1}{3} + \frac{1}{5} + \dots = \frac{\pi}{4}$

- b) Obtain the half range cosine series of $f(x) = x^2 - 2$ $0 \leq x \leq 2$ (7M)

6. a) Find inverse Fourier cosine transform of $\frac{1}{p} e^{-ap}$ (7M)

- b) Find the Fourier sine transform of $e^{-ax} \cos ax$ (7M)

7. a) Solve $4 \frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 3u$ given that $u(0, y) = 3e^{-y} - e^{-5y}$ (7M)

- b) Solve $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ subject to (7M)

(i) $u(x, 0) = 0$ for all x

(ii) $u(x, l) = 0$ for all x

(iii) $u(\infty, y) = 0, 0 \leq y \leq l$

(iv) $u(0, y) = y, 0 \leq y \leq l$

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