Code No: R161109 **R16** SET - 1

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**

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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 $f(x) = \begin{cases} 1 & if\ 0 < x < 1 \\ 0 & if\ 1 < x < 2 \end{cases}$ (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 1/3rd rule (iii) Simpson's 3/8th Rule. (7M)

   b) Solve $\frac{dy}{dx} = \frac{x+y}{2}$ using Taylor's method for x=1.1 given y (1)=1 (7M)
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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 $1 - \frac{1}{3} + \frac{1}{5} + \ldots = \frac{\pi}{4}$

b) Obtain the half range cosine series of $f(x) = x^2 - 2 \quad 0 \le x \le 2$ (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)

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

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

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

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