Code No: R161202 **R16** SET - 1

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2018
MATHEMATICS-II (MM)
(Com. to CE,EEE,ME,AE,AME,Bio-Tech,Chem E,Metal E,Min E,PCE,PE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering question in **Part-A** is Compulsory
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Write the two approximations of $x\log_{10} x = 1.2$ by Newton Raphson method. (2M)
   b) Define Average operator. (2M)
   c) Write the demerits of Picard's method. (2M)
   d) Write Formula for Simpson's 1/3rd rule. (2M)
   e) Write Dirichlet conditions on Fourier transform. (2M)
   f) Write the half range sine series in (0, L). (2M)
   g) Write the linear solution of wave (one dimensional) equations. (2M)

PART –B

2. a) Find the Real root of the equation $x^3 + 2x^2 + 10x - 20 = 0$ using Bisection method. (7M)
   b) Find the Real root of the equation $xe^x = \cos x$ using false position method. (7M)

3. a) Find f(0.5) using the data (0,5) , (1,1),(2,8), (3,15),(4,25),(5,30). (7M)
   b) Find the polynomial satisfied by (1, 2) ,(3,3) ,(4,5) , (6,9). (7M)

4. a) Find y(0.2) ,y(0.4) given that $y' = \frac{1}{2}xy,\ y(0) = 1$ by modified Euler's method. (7M)
   b) Evaluate $\int_1^2 \frac{dx}{x}$ using (i) Simpson's 1/3rd rule with h = 0.5 (ii) Trapezoidal rule with h = 0.25. (7M)

5. a) Find the half range cosine series $f(x) = \begin{cases} -x, & 0 < x < \frac{\pi}{2} \\ x, & \frac{\pi}{2} < x < \pi \end{cases}$ (7M)
   b) Find the Fourier series for $f(x) = \begin{cases} x, & 1 < x < 2 \\ 0, & 2 < x < 3 \end{cases}$ (7M)

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6. a) Find the Fourier sine and cosine transform exist for e^x (7M)

   b) Find the Fourier transform of $f(x) = \begin{cases} 1, |x| < a \\ 0, |x| > a \end{cases}$ (7M)

   Deduce that $\int_0^\infty \frac{\sin t}{t} dt = \frac{\pi}{2}$ and $\int_0^\infty \frac{\sin^2 t}{t^2} dt = \frac{\pi}{2}$

7. a) Solve the PDE $\frac{\partial u}{\partial x} - 2\frac{\partial u}{\partial y} = u$ and $u(x,0) = 3e^{-5x} + 2e^{-3x}$ (7M)

   b) A Rod of length 10 cm has its ends A and B kept at 50^0 C and 100^0 C until steady state conditions prevail. The temperature at A is then suddenly raised to 90^0 C and that at B is lowered to 60^0 C and the end temperatures are there after maintained. Find the temperature at a distance x from one end at a time. (7M)