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

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2017
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. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Write the geometrical interpretation of Newton-Raphson method. (2M)

   b) Prove that $\delta = 2sin\frac{hD}{2}$. (2M)

   c) Write Newton Back word interpolation formula. (2M)

   d) Write the Taylor's series to solve the D.E $\frac{dy}{dx} = f(x, y), y(x_0) = y_0$ (2M)

   e) Find the value of b_n in the half range sine series of f(x) = sinax in $[0,\pi]$. (2M)

   f) Write the Dirichlet conditions for Fourier Transforms. (2M)

   g) Write two dimensional Laplace equation. (2M)

PART -B

2. a) Find the Real root of $x^4 - x - 9 = 0$ using False position method. (7M)

   b) Find the Real root of $x = 2sinx$ using Iteration method. (7M)

3. a) Find the Missing term in the following data. (7M)

x	1	2	3	4	5
y	7	--	13	21	37

   b) Find f(32) using Gauss Backward interpolation formula from the following table. (7M)

x	25	30	35	40
y	0.2707	0.3027	0.3386	0.3794

4. a) Evaluate $\int_0^1 \sqrt{1+x^4}\,dx$ by taking h = 0.125 by (i) Simpson's 1/3 rd rule (ii) Simpson's 3/8th rule. (7M)

   b) Evaluate y (0.1) using RK method of fourth order for $\frac{dy}{dx} = y - \frac{2x}{y}$, $y(0) = 1$ (7M)
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5. a) Expand $f(x)=\begin{cases} x, -\frac{\pi}{2}<x<\frac{\pi}{2} \\ \pi-x, \frac{\pi}{2}<x<\frac{3\pi}{2} \end{cases}$ as half range cosine series. (7M)

   b) Expand $f(x)=\begin{cases} 4-x, 3<x<4 \\ x-4, 4<x<5 \end{cases}$ Fourier series. (7M)

6. a) Express the $f(x)=\begin{cases} 1 & if\ 0<x<\pi \\ 0 & if\ x>\pi \end{cases}$ as a Fourier sine integral. (7M)

   Hence Evaluate $\int_0^\infty \frac{(1-\cos\lambda\pi)\sin\lambda x}{\lambda}d\lambda$

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

   (or)

   And hence evaluate $\int_0^\infty \frac{\sin p}{p}dp\left[\int_0^\infty \frac{\sin x}{x}dx\right]$ & $\int_{-\infty}^\infty \frac{\sin ap\cos px}{p}dp$

7. a) Solve the PDE $\frac{\partial^2 u}{\partial x^2}=16\frac{\partial u}{\partial y}$ using method of variation of parameters. (7M)

   b) A rod of length 100 cm length has its ends A and B kept at 0^0 C and 100^0 C until steady state conditions prevail. The temperatures at the ends are changed to 20^0 C and 60^0 C respectively. Find the temperature in the rod. (7M)