Subject Code: R13207/R13 **Set No - 1**

I B.Tech II Semester Supplementary Examinations Dec./Jan. – 2015/2016

MATHEMATICS-II (MATHEMATICAL METHODS)

(Common to CE, ME, CSE, PCE, IT, Chem E, Aero E, Auto E, Min E, Pet E, Metal E)

Time: 3 hours **Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**
Answering the question in **Part-A** is Compulsory,
Three Questions should be answered from **Part-B**

*****

PART-A

1. (a) Find the root of the equation 3x = 1+cosx by Iteration method.
   (b) Prove that $\Delta \log f(x) = \log\left[1+\frac{\Delta f(x)}{f(x)}\right]$
   (c) Evaluate y (0.2) by Euler's method for $\frac{dy}{dx} = \frac{x+y}{y-x}$, $y(0)=1$.
   (d) Find $Z\left[\frac{1}{(n+1)!}\right]$
   (e) Obtain Half range sine series for f(x) = cosx in [0, 1]
   (f) Find finite Fourier cosine transform of f(x) = x+a for $0 < x < \pi$

[3+3+4+4+4+4]

PART-B

2. (a) Evaluate $1/\sqrt{12}$ using Newton Raphson method
   (b) Find the Real root of $4\sin x = e^x$ by False position method

[8+8]

3. (a) Fit a cubic polynomial for the following data
   $y_0 = 1, y_1 = 2, y_2 = 1, y_5 = 10.$
   (b) Find the Missing terms in the following data

x	45	50	55	60	65
y	3	--	2	--	-2.4

[8+8]

4. (a) By modified Euler's formula find y(0.01), y(0.02) given that $\frac{dy}{dx} = -y, y(0)=1$
   (b) By RK method of fourth order find y (0.1), y(0.2) given that $\frac{dy}{dx} = 1+y^2+x, y(0)=0$

[8+8]

5. (a) Find the Fourier series of $f(x) = e^{-x}$ $0 < x < 2\pi$ in (-π, π) ,

   (b) Find the Half range cosine series for $f(x) = \begin{cases} kx & 0 < x < \frac{\pi}{2} \\ k(\pi - x) & \frac{\pi}{2} < x < \pi \end{cases}$

[8+8]

6. (a) Find the Fourier cosine transform of $\frac{1}{\sqrt{x}}$

   (b) Find the Fourier sine transform of $\frac{e^{-ax}}{x}$

[8+8]

7. (a) Solve the difference equation $y_{n+2} - 5y_{n+1} + 6y_n = 3n + 5,\ y_0 = 1, y_1 = 3$ using Z-Transforms

   (b) Find $Z^{-1}\left[\frac{z^2}{(z^2 + 2z + 2)}\right]$

[8+8]

****