

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**

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**PART-A**

1. (a) Find the root of the equation  $3x = 1 + \cos x$  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  $f(x) = \cos x$  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
3. (a) Fit a cubic polynomial for the following data  
 $y_0 = 1, y_1 = 2, y_2 = 1, y_3 = 10$ .
- (b) Find the Missing terms in the following data

[8+8]

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]

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

(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]

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