Set No - 1

I B. Tech II Semester Supplementary Examinations Dec. - 2016
MATHEMATICS-II (MATHEMATICAL METHODS)
(Common to CE, ME, CSE, PCE, IT, Chem E, Aero E, Auto E, Min E, Pet E, Metal E, Textile Engg.)

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) Write the working rule to find the root of the equation y= f(x) by iteration method.
   (b) Prove that $h\Delta = \log(1+\Delta) = \sin^{-1}(\mu\delta)$.
   (c) By using Euler's formula find y(0.3) given that $\dfrac{dy}{dx} = x^2 - y^2, y(0) = 1$
   (d) Expand $f(x) = \begin{cases} 1, 0 < x < \pi \\ 0, \pi < x < 2\pi \end{cases}$ as Fourier series.
   (e) State and prove the linear property for Fourier transform
   (f) Find Z[n]

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

PART-B

2. (a) Find the root of the equation 3x = 1+cosx by using Newton Raphson method
   (b) Find the root of the equation $xe^x = 1$ by using False position method

   [8+8]

3. (a) Find f(5.5) using Newton's Backward formula for the following table

x	0	1	2	3	4	5	6
y=f(x)	0	1	16	81	256	625	1296

   (b) Find the Lagrange's polynomial for the following data

x	0	1	2	5
y	2	3	12	147

   [8+8]

4. (a) By RK method of fourth order find y (0.2) ,y(0.4) given that $\dfrac{dy}{dx} = y^2 - x, y(0) = 1$

   (b) Obtain Taylor's series expansion for $\dfrac{dy}{dx} = x^2 + y$, $y(0) = 1$, hence evaluate y (0.1)

   [8+8]

5. (a) Find the half-range cosine for the function f(x) = x in the range 0<x<π.
   (b) Define a periodic function and find Fourier expansion for f(x) = x-x² -1<x<1.

   [8+8]

6. (a) Find the Fourier transform of f(x) defined by $e^{-|x|}, -\infty < x < \infty$
   (b) Find the Fourier sine transform of e^{-ax}, a > 0 and hence deduce the inversion formula for
   $$\int_0^\infty \frac{p \, sin \, px}{a^2 + p^2} dp$$

   [8+8]

7. (a) If $f(z) = \frac{2z^2 + 3z + 4}{(z-1)^3}, |z| > 3$, then find the value of f(1), f(2) and f(3).

   (b) Evaluate $Z^{-1} \left[\frac{z^2}{(z-1)(z-3)} \right]$, using convolution theorem.

   [8+8]

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