

Code No: R13107

R13

SET - 1

I B. Tech I Semester Supplementary Examinations, May - 2017

MATHEMATICS-II (MM)

(Com. to ECE, EEE, EIE, BOT, E.Com.E, AGE)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)

2. Answering the question in **Part-A** is Compulsory

3. Answer any **THREE** Questions from **Part-B**

PART -A

1. a) What is the order of convergence and write the order of convergence for iteration method. (3M)
- b) Prove that $\Delta^2 f_i = (f_i + f_{i+1})\Delta f_i$ (3M)
- c) Write the merits and demerits of Euler's method. (4M)
- d) Write the Fourier half range sine series for $f(x) = \sin x$ in $[0, \pi]$. (4M)
- e) Find $Z\left[\frac{1}{(n+1)!}\right]$ (4M)
- f) If $F(p)$, is the complex Fourier transform of $f(x)$, then prove that the complex Fourier transform of $f(x - a)$ is $e^{-ipa} F(p)$. (4M)

PART -B

2. a) Find the root of the equation $xe^x = 2$ by using Bisection method. (8M)
 - b) Find the root of the equation $x^3 - 5x + 1 = 0$ by using Newton Raphson method. (8M)
 3. a) Find the unique polynomial $p(x)$ of degree 2 or less such that $p(1)=1$, $p(3)=27$, $p(4)=64$. (8M)
 - b) Area A of circle and diameter d is given for the following values (8M)
- | | | | | | |
|---|------|------|------|------|------|
| d | 80 | 85 | 90 | 95 | 100 |
| A | 5026 | 5674 | 6362 | 7088 | 7854 |
- Calculate the area of circle of diameter 105.
4. a) Solve $y' = xy$, $y(0) = 1$ by using Picard's Method. (8M)
 - b) Find $y(1.25), y(1.5)$ using RK method of fourth order for $\frac{dy}{dx} = y - x^2$, $y(0) = 1$ (8M)
 5. a) Find the Fourier series for $f(x) = 2x - x^2$ in $0 < x < 3$. (8M)
 - b) Find the cosine series of $f(x) = \sin x$ for k not an integer. (8M)
 6. a) Find the Fourier cosine and sine transform of e^{-ax} , $a > 0$ and hence deduce the inversion formula for (i) $\int_0^\infty \frac{p \cos px}{a^2 + p^2} dp$ (ii) $\int_0^\infty \frac{p \sin px}{a^2 + p^2} dp$. (8M)
 - b) Find the Fourier transforms $f(x) = \begin{cases} x & \text{if } |x| \leq a \\ 0 & \text{if } |x| > a \end{cases}$ (8M)
 7. a) Find $Z(2.3^n + 5.n)$ and deduce $Z[2.3^{n+3} + 5(n+3)]$ using shifting theorem. (8M)
 - b) Find the inverse Z - transform of $\left[\frac{z}{z^2 + 11z + 24}\right]$ (8M)