

Subject Code: R13107/R13

Set No - 1

I B. Tech I Semester Supplementary Examinations May/June - 2016

MATHEMATICS-II (MATHEMATICAL METHODS)

(Common to ECE, EEE, EIE, BioTech, EComE, Agri.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

- (a) Find the root of the equation $n f(x) = 1 + \tan^{-1}(x)$ by iteration method
 (b) Prove that $\Delta = \nabla E = E^{1/2}$
 (c) Write the merits and demerits of Picard's Method
 (d) Find the Half range sine series of $f(x) = x$ in $[0, 2]$
 (e) Find the finite Fourier cosine trans form of $f(x) = \pi/3 - x + x^2/2\pi$ in $[0, \pi]$
 (f) Find $Z[\sin ht]$

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

PART-B

- (a) Find the Real root of $xe^x = 2$ by False position method
 (b) Find the Real root of $x^4 - x - 9 = 0$ by Newton –Raphson method
- (a) Find the population for the year 1963 from the following table

[8+8]

Year(x)	1921	1931	1941	1951	1961
Population(y)	19.96	39.65	58.81	77.21	94.61

- (b) Find the interpolation polynomial form the following data

X	5	6	9	11
Y	12	13	14	16

[8+8]

- (a) Apply Rk method of fourth order to find $y(1.2)$ given that $y' = x^2 + y^2$, $y(1) = 1.5$
 (b) Find $y(0.1)$ by Modified Euler's method given that $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y(0) = 1$

[8+8]

- (a) Obtain Fourier series for $f(x) = e^{ax}$ in $[-\pi, \pi]$

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

(8+8)

- (a) Find Fourier transform of $f(x) = xe^{-x}$ $0 < x < \infty$

- (b) Find the Fourier sine transform of $e^{-|x|}$ and hence evaluate $\int_0^\infty \frac{x \sin mx}{1+x^2} dx$

[8+8]

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7. Find
- (a) $Z[n^2 a^n]$
 - (b) $Z[\sinh(n\pi/2 + \theta)]$
 - (c) $Z[n \sin n\theta]$
 - (d) $Z^{-1} \left[\frac{z^2 + z}{(z-1)^2} \right]$

[4+4+4+4]

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