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Code No: RA13207 **R13** **RA**

I B. Tech II Semester Supplementary Examinations, April/May - 2018
MATHEMATICS-II (MM)

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**

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PART –A

1. a) Find the Newton Raphson scheme to find the square root of a real number R. (4M)

b) Show that $\Delta f_i^2 = (f_i + f_{i+1})\Delta f_i$. (3M)

c) If dy/dx = x-y and y(0)=1, then find the value of $y^{(1)}(0.1)$ using Picard's method . (4M)

d) Write the Fourier series of the function f(x) = x^2 in ($-\pi$, π). (4M)

e) State and prove Change of scale property of Fourier transforms. (3M)

f) Prove that $Z(\cos nt) = \dfrac{z(z-\cos t)}{z^2 - 2z\cos t + 1}$. (4M)

PART –B

2. a) Find the root of the equation $x\log_{10}(x) = 1.2$ using False position method. (8M)

b) Find a root of $xe^x - \cos x = 0$ using Newton-Raphson method. (8M)

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3. a) P.T. $\Delta \tan^{-1}\left(\dfrac{n-1}{n}\right) = \tan^{-1}\left(\dfrac{1}{2n^2}\right)$. (8M)

b) Find the interpolating polynomial f(x) as a cubic polynomial from the table. (8M)

x	0	1	4	5
f(x)	4	3	24	39

4. a) Evaluate the values of y(1.1) and y(1.2) from $y'' + y^2 y' = x^3$; y(1) = 1, $y'(1) = 1$ by using Taylor series method. (8M)

b) Apply the fourth order Runge-Kutta method, to find an approximate value of y when x = 1.2, in steps of 0.1, given that : $y' = x^2 + y^2$, y(1) = 1.5. (8M)

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5. a) Obtain the Fourier cosine series for f(x) = x sin x, $0 < x < \pi$. (8M)

   b) Find the Fourier series of $f(x) = \left(\frac{\pi - x}{2}\right)$ in the interval $0 < x < 2\pi$. (8M)

6. a) Find the finite Fourier sine transform of $f(x) = x^3$ in $(0, \pi)$. (8M)

   b) If F(p) is the complex Fourier transform of f(x), then find the complex Fourier transform of f(x) sin ax in terms of F(p). (8M)

7. a) Find the inverse Z – transform of $\frac{z}{(z^2+1)(z-1)}$. (8M)

   b) Using Z – transform, solve $y_{n+2} + 2y_{n+1} + y_n = n$. Given that $y_0 = y_1 = 0$. (8M)

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