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II/IV B.Tech. DEGREE EXAMINATIONS, NOVEMBER- 2019

First Semester

CSE/IT

MATHEMATICS-III

Time: Three Hours **Maximum marks:60**

Answer Question No.1 Compulsory **6X2=12 M**

Answer ONE Question from each Unit **4X12=48 M**

1. a) Define Partial differential equation and give example.
   b) Write formula for Trapezoidal rule
   c) Give Fourier's Integral formula
   d) Define Fourier Sine and Cosine Transforms
   e) What is the covergence of Newton-Raphson method
   f) Give formula for Simpson's three-eigth rule.

UNIT-I

2. From the partial differential equations by eliminating constants from

   i) $z = ax^3 + by^3$ ii) $\log(az - 1) = x + ay + b$

(OR)

3. Solve $z^2\left(p^2 + q^2\right) = x^2 + y^2$

UNIT-II

4. Find the finite Fourier sine and cosine transforms of f(x)=2x, 0 < x < 4

(OR)

5. Using Newton-Raphson method derive formula to find square root of a nubmer and hence find square root of 24 and 10.

P.T.O

UNIT-III

6. Consider the following data for $g(x) = \frac{\sin x}{x^2}$ and hence calculate g(0.25) accurately using Newton's forward method of interpolation.

X	0.1	0.2	0.3	0.4	0.5
g(x)	9.9833	4.9696	3.2836	2.4339	1.9177

(OR)

7. Use Gauss Forward interpolation formula to find f(3.3) from the following table

X	1	2	3	4	5
Y=f(x)	15.30	15.10	15.00	14.50	14.00

UNIT-IV

8. Find the solution of $\frac{dy}{dx} = x - y, y(0) = 1$ at x=0.1, 0.2, 0.3, 0.4 and 0.5 using modified Euler's method.

(OR)

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

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II/IV B.Tech. (Supple) DEGREE EXAMINATIONS, JUNE- 2019

First Semester

CSE/IT

MATHEMATICS-III

Time: Three Hours **Maximum marks:60**

Answer Question No.1 Compulsory **6X2=12 M**

Answer ONE Question from each Unit **4X12=48 M**

1. a) Give the rules for finding the particular integral
   b) Define Gauss Seidel method
   c) Prove that $\nabla = 1-(1-\nabla)^{-1}$
   d) Parseval's identity
   e) Mention Stirling formula
   f) Define Picard's method

UNIT-I

2. a) Solve the partial differential equation:

$$\frac{p}{x^2}+\frac{q}{y^2}=z$$

   b) Form the partial differential equation by eliminating the arbitrary constants $z=ax^3+by^3$.
   c) Find $Z\left[\frac{1}{(n+2)(n+3)}\right]$

(OR)

3. a) Solve the partial differential equation $z(x-y)=px^2-qy^2$.
   b) Solve the difference equation, using Z-transforms $u_{n+2}-3u_{n+1}+2u_n=0$ given that $u_0=0$ $u_1=1$.
   c) Form the partial differential equation by eliminating the arbitrary function from $f\left(x^2+y^2+z^2, xy+z\right)$

P.T.O

UNIT-II

4. a) Find the Fourier Transforms of f(x)= $\begin{cases} a^2 - x^2 & ; |x| < 1 \\ 0 & ; |x| > 1 \end{cases}$

Deduce that $\int_0^{\infty} \frac{\sin t - t\cos t}{t^3} dt = \frac{\pi}{4}$. Using Parseval's identity prove that

$$\int_0^{\infty} \left(\frac{\sin t - t\cos t}{t^3} \right)^2 dt = \frac{\pi}{15}$$

b)

(OR)

5. a) Find the Fourier sine series for f(x)=2x-x^2, in 0 < x < 3 and f(x+3)=f(x).

b) Find the Fourier series for f(x)=21x-x^2 in 0<x<21 and hence deduce

$$1 - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + ... = \frac{\pi^2}{12}$$

UNIT-III

6. a) The length of an insect varies for 10, 25, 47,81 days as 14.1321, 17.2172, 19.1729, 21.1892. Find the insect length at 28th day using Lagrange inter polation formula.

b) Using Gauss backward interpolation formula find $y\left(50^{O}42'\right)$ given that

x	50	51	52	53	54
y=tanx	1.1918	1.2349	1.2799	1.327	1.3764

(OR)

7. a) From the following table of half yearly premium for policies at quinquennial ages, estimate the premium for policies at the age of 63.

Age:x:	45	50	55	60	65
Premium:y:	114.84	96.16	83.32	74.48	68.48

b) Given u1=23, u2=29, u4=82, u7=106, u8=206, find u6. Use Lagrange's interpolation formula.

P.T.O

UNIT-IV

8. Find y(0.5), y(1) and y(1.5), given that $y' = 4 - 2x, y(0) = 2$ with h=0.5 using Modified Euler method.

(OR)

9. a) By the methods of least squares fit a parabola of the form $y=a+bx+cx^2$ for the following data

x	2	4	6	8	10
y	3.07	12.85	31.47	57.38	91.29

b) Evaluate $\int_0^1 e^{-x^2}$ by taking h=0.2 using Simpson's $\frac{1}{3}^{rd}$ and Trapezoidal rule.