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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations December-2021

MATHEMATICS-III

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 60

PART-A

(Answer all the Questions 5 x 2 = 10 Marks)

- 1 a Write Simpson's formulae. 2M
- b Use Euler's method to find $y(0.1)$ given $y' = (x^3 + xy^2)e^{-x}$, $y(0) = 1$. 2M
- c Find the Laplace transform of $3 \cos 3t \cdot \cos 4t$. 2M
- d Find the finite Fourier sine transform of $f(x) = 2x$, $0 < x < 4$. 2M
- e Solve $p(1+q) = qz$. 2M

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

- 2 Find the root of the equation $xe^x = 2$ using Regula-Falsi method. 10M

OR

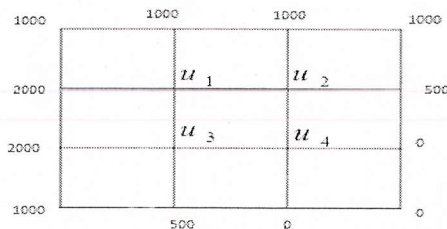
- 3 a Compute $\int_0^4 e^x dx$ by Simpson's $\frac{1}{3}$ rule with 10 sub divisions. 5M
- b Compute $\int_3^7 x^2 \log x dx$ using trapezoidal rule and Simpson's rule by taking 10 sub divisions. 5M

UNIT-II

- 4 Using R-K method of 4th order, solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$, $y(0) = 1$ Find $y(0.2)$ and $y(0.4)$. 10M

OR

- 5 Evaluate the function $u(x,y)$ satisfying $\nabla^2 u = 0$ at the pivotal points given the boundary values as follows: 10M

**UNIT-III**

- 6 a Find the Laplace transform of $f(t) = e^{-4t} \int_0^t \frac{\sin 3t}{t} dt$. 5M
- b Find the Laplace transform of $f(t) = t e^{2t} \sin 3t$. 5M

OR

- 7 Solve the D.E $\frac{d^2x}{dt^2} + 9x = \sin t$ using Laplace Transform given that $x(0) = 1, x\left(\frac{\pi}{2}\right) = 1$. 10M

UNIT-IV

- 8 a Prove that $F[x^n f(x)] = (-i)^n \frac{d^n}{dp^n} [F(p)]$. 5M

- b Prove that $F_s\{x f(x)\} = -\frac{d}{dp} [F_c(p)]$. 5M

OR

- 9 Find the inverse Fourier sine transform of $f(x)$ of $F_s(p) = \frac{p}{1+p^2}$. 10M

UNIT-V

- 10 a Solve $(D^2 + 3DD' + 2D'^2)z = 24xy$. 5M

- b Solve $\frac{\partial^3 z}{\partial x^3} - 2\frac{\partial^3 z}{\partial x^2 \partial y} = 2e^{2x} + 3x^2 y$. 5M

OR

- 11 A homogeneous rod of conducting material of length 100cm has its ends kept at zero temperature and the temperature initially is 10M

$$u(x, 0) = x, \quad 0 \leq x \leq 50$$

$$= 100 - x, \quad 50 \leq x \leq 100$$

Find the temperature $u(x, t)$ at any time.

END