PVP 14

Code: EE3T1

II B.Tech - I Semester – Regular/Supplementary Examinations
November 2019

NUMERICAL METHODS AND DIFFERENTIAL EQUATIONS

(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11x 2 = 22 M

1.

a) Establish the Newton's iterative formula to find the value of $\sqrt{N}$.

b) Prove that $\mu^2 = 1 + \frac{\delta^2}{4}$.

c) Write Lagrange's interpolation formula for the points $(x_0, y_0), (x_1, y_1), (x_2, y_2)$.

d) Write the expression for $\left(\frac{dy}{dx}\right)_{x=x_0}$ using Forward difference.

e) Using Trapezoidal rule, evaluate $\int_1^4 f(x)dx$ if

x	1	2	4
f(x)	2	2.7	2.1

f) Apply Euler's method to find $y(0.1)$ if $\frac{dy}{dx} = x^2 - y$ with $y(0) = 1$.

g) Find $y(0.2)$ if $\frac{dy}{dx} = x + y$ and $y(0) = 1$, by using Picard's method.

h) Form a partial differential equation by eliminating the arbitrary constants a and b from the equation $z = ax + by + a^2 + b^2$.

i) Find the solution of the equation $pq = 1$.

j) Solve $4u_x + u_y = 3u$

k) State one dimensional wave equation.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Find a real root of $x^3-2x-5=0$ by using Regula Falsi method. 8 M

b) Using Newton backward difference formula, find y(4) from the following data 8 M

x	0	1	2	3
y	1	2	1	10

3. a) Find the first derivative of the function tabulated below at the point $x = 6$. 8 M

X	0	1	2	3	4	5	6
Y	6.9897	7.4036	7.7815	8.1291	8.4510	8.7506	9.0309

b) Using Simpson's $\frac{1}{3}$ and Simpson's $\frac{3}{8}$ rule, evaluate $\int_0^6 \frac{dx}{1+x^2}$ by taking n=6. 8 M

4. a) Solve $y' = x - y^2$, $y(0) = 1$ by using Taylor's series method and compute $y(0.1)$ & $y(0.2)$. 8 M

b) Use R-K- method to evaluate $y(0.1)$ & $y(0.2)$ given that $y' = x + y$, $y(0) = 1$. 8 M

5. a) Form the partial differential equation by eliminating the arbitrary function from $xyz = f(x + y + z)$. 8 M

b) Solve $p^2 + q^2 = x^2 + y^2$. 8 M

6. a) Solve $u_x = 4u_y$ with $u(0, y) = 8e^{-3y}$ by the method of separation of variables. 8 M

b) A bar 20cm. length, with insulated sides, has its ends kept at 100c and 600c until steady state conditions prevail. The two ends are then suddenly insulated and kept so. Find the initial temperature distribution. 8 M