CSE/CE

Subject : Applied Mathematics-

Time : 3 Hours

Course: Polytechnic
Full Marks: 70
Pass Marks: 28

- Candidates are required to give their answers in their own words as far as practicable.
- Question Paper is divided into **Three Parts –A, B & C**
- **Part-A** is compulsory.
- **Part- B** contains Six questions out of which **Four** questions are to be answered.
- **Part- C** contains Four questions out of which **Three** questions are to be answered.

PART A

Q.1)   **All questions are compulsory**   (10x2=20Marks)

1) Write Picard's general formula.

2) Define Rounding error.

3) Define significant figure.

4) Write Newton Forward interpolation Formula.

5) Write Taylor's series formula.

6) Errors may occur in performing numerical computation on the computer due to

7) Rounding errors b) Power fluctuation c) Operator fatigue d) All of these

8) In Regula-falsi method, the first approximation is given by

  a) $x_1 = \frac{a f(a) - b f(a)}{f(b) - f(a)}$ b) $x_1 = \frac{bf(b) - af(a)}{f(b) - f(a)}$ c) $x_1 = \frac{bf(a) - af(b)}{f(a) - f(b)}$ d) $x_1 = \frac{af(a) - bf(b)}{f(a) - f(b)}$

9) Which of the following alter name of method of false position?

  a) Method of chords   b) Methods of tangents   c) Method of bisection d) Regula falsi method

10) The number of significant digits in the number 704020550

  a) 5   b) 6   c) 8   d) 9

11) Which relation is Correct?

12) a) $E = 1 + \Delta$ b) $E = 1 - \Delta$ c) $E = 1 + \nabla$ d) $E = 1 - \nabla$

5- c -x

PART B

Answer any four: (4x5=20)

Q 2) Evaluate $\sqrt{18}$ by Newton Raphson method.

Q 3) Given $log_{10}654 = 2.8156$, $log_{10}658 = 2.8182$, $log_{10}659 = 2.8189$, $log_{10}661 = 2.8202$,

Find $log_{10}656$.

Q 4) Find the first order derivative of the function tabulated below, at the point x=1.5

x	1.5	2.0	2.5	3.0	3.5	4.0
$f(x)$	3.375	7.000	13.625	24.000	38.875	59.000

Q 5) Find the real root of the equation $x log_{10}x - 1.2 = 0$ by false position method.

Q 6) What is the difference between $\left(\frac{\Delta}{E}\right)^2 u_x$ and $\left(\frac{\Delta^2 u_x}{E^2 u_x}\right)$ if $u = x^3$, the interval of difference being h.

Q 7) Use Rungee-Kutta method to find y(0.1) given that $\frac{dy}{dx} = \frac{1}{x+y}$, y(0)=1.

PART C

Answer any three: (3x10=30)

Q 8) Using Taylor's method, solve $\frac{dy}{dx} = 1 + xy$ with y(0) = 2. Find y(0.1) , y(0.2), y(0.3)

Q 9) Apply Gauss-Jordon method to solve the equations

$$2x + y + 4z = 12$$
$$8x - 3y + 2z = 20$$
$$4x + 11y - z = 33$$

Q 10) Solve the equations, by factorization method.

$$3x + 2y + 7z = 4$$
$$2x + 3y + z = 5$$
$$3x + 4y + z = 8$$

Q11) Evaluate $I = \int_{4}^{5.2} log_e x \, dx$ by (a) Simpson's 1/3 rule (b) Simpson's 3/8 rule (c) Trapezoidal rule