Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 07

B.Sc.(IT) (Sem.–4)

COMPUTER ORIENTED NUMERICAL METHODS

Subject Code : BS-208

Paper ID : [B0416]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and a student has to attempt any FOUR questions.**

SECTION-A

1. Write briefly :

(a) Add .6434E3 to .4845E3.

(b) What do you understand by the term pivot? Explain briefly different types of pivoting.

(c) Check whether the system $1.01x + 2y = 2.01$, $x + 2y = 2$ is ill conditioned or not?

(d) Explain briefly the method of false position to find root of an equation.

(e) Some experimental values of x and y are given below, if $y = a_0 + a_1x$, find approximate values of a_0 and a_1.

x	:	0	2	5	7
y	:	–1	5	12	20

(f) Write formula for the Runge-Kutte method of order four.

(g) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using Simpson's Rule.

(h) If $f(0) = 8$, $f(1) = 68$ and $f(5) = 123$, construct a divided difference table.

(i) Write algorithm to find order of a polynomial.

(j) Write algorithm to perform division of two normalized floating-point numbers.

SECTION-B

2. (a) Formulate an algorithm to find the largest of the find real numbers represented by variables a, b, c, d and e.

   (b) Discuss the various types of errors that occur while performing numerical computations. What measures can be taken to improve the accuracy in the numerical computations?

3. (a) Calculate a root of the equation $x^4 - x - 13 = 0$ correct to four decimal places.

   (b) Solve by using Gauss-Seidal method

   $10x + 2y + z = 9,$

   $2x + 20y - 2z = -44,$

   $-2x + 3y + 10z = 22.$

4. (a) Use Lagrange's interpolation formula to find the value of y when $x = 10$, if the following values of x and y are given :

x	**:**	5	6	9	11
y	**:**	12	13	14	16

   (b) Evaluate approximately $\int_1^2 4e^{-x}dx$. Also find an error incurred in the approximation.

5. (a) Write an algorithm to fit a regression line of Y on X by least squares.

   (b) Explain briefly Taylor Series representation to approximate a function by a polynomial.

6. Apply Euler's method to solve $\frac{dy}{dx} = x + y$, $y(0) = 0$, choosing the step length $h = 0.2$ (carry out 6 steps.)

7. (a) Find $f^1(0.75)$ from the following table

x	**:**	0.50	0.75	1.00	1.25	1.50
f(x)	**:**	0.13	0.42	1.00	1.95	2.35

   (b) Given $\frac{dy}{dx} = 1 + y^2$, with $y(0) = 0$, $y(0.2) = 0.20274$, $y(0.4) = 0.4228$ and $y(0.6) = 0.6841$. Compute $y(0.8)$. Using Predictor-corrector method.