

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- Vth SEMESTER-EXAMINATION – MAY/JUNE - 2012****Subject code: 151601****Date: 01/06/2012****Subject Name: Computer Oriented Statistical Methods****Time: 02:30 pm – 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain Floating Point Representation of number with example. **03**
 (b) Explain different types of Errors with it's propagation during computation & how to improve the accuracy of Numeric Computation. **06**
 (c) Describe BAIRSTOW method in brief. **05**

- Q.2** (a) Explain Newton Raphson Method in detail **07**
 (b) Find the root of the equation $x^4 - x - 10 = 0$ upto 3 decimal points using Bisection Method. **07**

OR

- (b) Find the approximate root of the equation $x^3 - 4x - 9 = 0$ by using False Position Method. **07**

- Q.3** (a) Differentiate Interpolation & Extrapolation. **03**
 (b) Explain Cubic Spline Interpolation with it's conditions. **03**
 (c) Write Lagrange Interpolation Algorithm & Solve the following using it: **08**
 Find $f(x)$ at $x=4$.

| | | | |
|--------|-------|---|----|
| X | 1.5 | 3 | 6 |
| $f(x)$ | -0.25 | 2 | 20 |

OR

- Q.3** (a) Consider the following table: **08**

| | | | |
|--------|-------|-------|-------|
| x | 20 | 25 | 30 |
| $f(x)$ | 0.342 | 0.423 | 0.500 |

Find the value of x where $f(x) = 0.399$ using Inverse Interpolation. Would you use the difference method or Lagrangian Method?

- (b) Explain Linear Regression & it's algorithm. **06**

- Q.4** (a) Estimate the value of Production for the year 1984 using Newton Forward method for following Data. **06**

| | | | | |
|------------|------|------|------|------|
| Year | 1976 | 1978 | 1980 | 1982 |
| Production | 20 | 27 | 38 | 50 |

- (b) Evaluate $\int_1^2 x^2 dx$ using Trapezoidal Rule by taking $h=1/8$. **04**

- (c) Explain Simpson 1/3 Rule in detail. **04**

OR

Q.4 (a) Solve $dy/dx = 2x - y$, $y(0) = 2$ in the range $0 \leq x \leq 0.3$ by taking $h=0.1$ using Euler's Method. **07**

(b) Solve the $dy/dx = x^2 - y$, $y(0) = 1$. Find $y(0.1)$ and $y(0.2)$, $h=0.1$ using Runge Kutta's 2nd Order Method. **07**

Q.5 (a) Use the Gauss Elimination Method to solve the equations: **07**

$$3x + 4y - z = 8$$

$$-2x + y + z = 3$$

$$x + 2y - z = 2$$

(b) Solve the following equations by Gauss-Seidel procedure. The answer should be correct to 3 significant digits. **07**

$$9x_1 + 2x_2 + 4x_3 = 20$$

$$x_1 + 10x_2 + 4x_3 = 6$$

$$2x_1 - 4x_2 + 10x_3 = -15$$

OR

Q.5 (a) Find the coefficient of correlation by spearman's method from the following data & comment on the result. **07**

| | | | | | | | | | | |
|-------------|-----|----|-----|-----|----|-----|----|-----|-----|-----|
| IQ X_i | 106 | 86 | 100 | 101 | 99 | 103 | 97 | 113 | 112 | 110 |
| Hours Y_i | 7 | 0 | 27 | 50 | 28 | 29 | 20 | 12 | 6 | 17 |

The above data shows the correlation between the IQ of a person and number of hours spent in front of the TV per week by person.

(b) Consider the Following Data & show that 4 year centered moving averages is equivalent to a 5 year weighted moving average with weights 1,2,2,2,1. **07**

| Year | Annual Sales |
|------|--------------|
| 1983 | 7 |
| 1984 | 6 |
| 1985 | 1 |
| 1986 | 5 |
| 1987 | 3 |
| 1988 | 7 |
| 1989 | 2 |
| 1990 | 6 |
| 1991 | 4 |
| 1992 | 8 |
| 1993 | 3 |
