

**B.TECH THIRD SEMESTER EXAMINATION, 2008-9**  
**COMPUTER BASED NUMERICAL & STATISTICAL TECHNIQUES**  
**PAPER CODE : TCS-302**

Time : 3 Hours

M.Marks : 100

Attempt any five questions.

Q. 1.

- Compute the real root of  $x^3 - 5x + 3 = 0$  in the interval  $[1, 2]$  by the Regula falsi method perform three iteration only.
- By Newton Raphson method find the positive root of  $f(u) = x - 2 \sin x$ . choose suitable initial guess and perform three iterations.
- Find the root of the equation  $f(u) = x^3 - 3x - 5 = 0$  which lies between 2 and 3 by the Muller's method . Perform two iterations only .

Q. 2

- Apply the quotient – difference method to obtain the approximate roots of the equation.  $x^3 - 7x^2 + 10x - 2 = 0$
- Define rate of convergence. Obtain rate of convergence of Newton Raphson method.
- Applying Lagrange's formula , find the interpolating polynomial  $f(x)$  for the following set of observations.

X :	0	1	4	5
Y :	4	3	24	39

Also find  $f(2)$

Q3.

- From the following table. Find the number of students who obtained less than 45 marks by method of interpolation.

Marks:	0-30	31-40	41-50	51-60	61-70	71-80	81-90
No. of Students	0	31	42	51	35	31	5

- The ordinates of the normal curve are given by the following table

X :	.0	.2	.4	.6	.8
Y :	.3989	.3910	.3683	.3332	.2897

Calculate: (i)  $y(.25)$  (ii)  $y(.62)$

Use Newton's method of interpolation.

- Use stirling's formula to find  $y(28)$  given

X :	20	25	30	35	40
Y :	49225	48316	47236	45926	44306

Q. 4.

- By means of Newton's divided difference formula, find the values of  $f(2)$ ,  $f(8)$  and  $f(15)$  from the following table.

X :	4	5	7	10	11	13
F(u)	48	100	294	900	1210	2028

- b. Differentiate between interpolation and curve fitting.  
c. Describe the methods of finding complex roots in detail.

Q.5.

(a) Fit a natural cubic spline to the following data:

X :	2	3	4
Y :	11	49	121

Hence compute

(i)  $y(2.5)$  and

(ii)  $y'(2)$

(b) Find the first and second derivative at 1.1 for the data

X	1.00	1.2	1.4	1.6	1.8	2.00
Y	0	.1280	.5440	1.2960	2.432	4.00

Q.6

a. Evaluate the integral

$$\int_0^1 \frac{x^2}{1+x^3} dx$$

Simpson's rule taking four equal intervals and hence the value of  $\log_e 2$ .

Q.7. attempt any two

a. For a bi variate distribution  $n = 18$ ,

$$\sum X^2 = 60, \sum y^2 = 96, \sum x = 12, \sum y = 18, \sum xy = 40$$

Find the equations of lines of regressions.

b. Fit the curve  $y = ax^b$  to the following data, using method of least squares

X	1	2	3	4	5	6
Y	2.98	4.26	5.21	6.1	6.8	7.5

c. Write short notes on

- Quality control methods
- Multiple Regression Analysis