Printed Pages : 4   CS – 406

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1034   Roll No.

B. Tech.

(SEM. IV) EXAMINATION, 2006-07

COMPUTER BASED NUMERICAL & STATISTICAL TECHNIQUES

Time : 2 Hours]   *[Total Marks : 50*

Note :   Attempt *all* the questions.

1   Attempt any **four** of the following :   4×3=12

(a)   If $u = 3\vartheta^7 - 6\vartheta$ find the percentage error in u at $\vartheta = 1,$ if the error in ϑ is 0.05.

(b)   Compute the real root of $x^3 - 5x + 3 = 0$ in the interval [1,2] by the Regula falsi method. Perform three iterations only.

(c)   By Newton Raphson method find the positive root of $f(u) = x - 2 \sin x.$

Choose suitable initial guess and perform three iterations.

(d)   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.

(e) Apply the quotient – difference method to obtain the approximate roots of the equation. $X^3 - 7x^2 + 10x - 2 = 0$.

(f) Define rate of convergence. Obtain rate of convergence of Newton Raphson method.

2 Attempt any **four** of the following : 4×3=12

(a) 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	81-100
No. of Students :	0	31	42	51	35	31	5

(b) 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.

(c) Use stirling formula to find y(28) given

x :	20	25	30	35	40
y :	49225	48316	47236	45926	44306

(d) 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).

(e) 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

(f) Differentiate between interpolation and curve fitting.

3 Attempt any **two** parts :   7×2=14

(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
f(u) :	0	.1280	.5440	1.2960	2.432	4.00

(c) Evaluate the integral

$$\int_{0}^{1} \frac{x^2}{1+x^3}\,dx$$

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

4 Attempt any **two** parts : **6×2=12**

(a) For a bi variate distribution n = 18,

$$\sum x^2 = 60, \sum y^2 = 96, \sum x = 12, \sum y = 18, \sum xy = 48$$

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 : **6×2=12**

(i) Quality Control Methods

(ii) Multiple Regression Analysis.

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