

Bachelor of Science (Information technology)
Annual Examinations – 2006

Paper BITD – 403
Numerical and Stats

Time allowed: Three hours

Maximum Marks: 100

SECTION – I

Q1. Attempt all the questions given below:

1X20=20

- i) What is absolute error?
- ii) Regula Falsi Method is used for _____.
- iii) The formula to compute root of a function by using Newton Raphson Method is _____.
- iv) If $\text{rank}(A) < \text{rank}(A : B)$, the set of equations $AX=B$ is _____.
- v) The system of equation $AX = B$ is known as system of homogenous linear equations if B is _____.
- vi) The Transpose of the inverse of a matrix is equal to the _____.
- vii) $(AB)^{-1} =$ _____.
- viii) Write the name of iterative methods to solve the system of linear equations.
- ix) For a function $f(x)$ if the point x is outside the interval $[x_1, x_n]$. Then the estimation of $f(x)$ is called _____.
- x) $\Delta y_5 =$ _____.
- xi) What is relationship between E and Δ operator.
- xii) Write the Formula for Trapezoidal rule to find integration of a function from x_0 to x_n .
- xiii) What will be the value of n to compute $\int_{x_0}^{x_n} f(x) dx$ using Simpson's one third rule.
- xiv) Write the relationship between mean, median and mode.
- xv) Write the formula to determine the median when 'greater than' type cumulative frequencies are given.
- xvi) Write the formula to determine the mode when data are in the form of a grouped frequency distribution.
- xvii) The mean deviation is used to show _____.
- xviii) The formula to compute standard deviation ' v ' is _____.
- xix) Standard deviation is independent of _____.
- xx) Kurtosis show the _____ of data.

SECTION – II

Q2. Answer any six questions. All questions carry equal mark.

5X6=30

- a) Write different types of error in computation and different ways to measure these errors.

- b) Complete the root of the function $f(x) = x^2 - 7$ between $x_0 = 2$ and $x_1 = 3$ using Regula falsi Method.
- c) Derive the formula to find cube root of a no. N using Newton Raphson Method.
- d) Determine one real root of $x^2 \sin x + x \cos x = 0$ using bysection method.
- e) Solve the system of equation

$$x + 2y + 3z = 14$$

$$3x + y + 2z = 11$$

$$2x + 3y + z = 11$$

Using Gauss elimination method.

- f) The frequency distribution of marks obtained by 60 students of a class in a college is given below.

Marks :	30-34	35-39	40-44	45-49	50-54	55-59	60-64
No. of students:	3	5	12	18	14	6	2

Draw a histogram for the distribution.

- g) Calculate the Median of the following data:

Height in inches:	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11
No of persons:	3	7	12	16	22	20	13	7

- h) If Mean = 42.2 and Median = 41.9 then calculate Mode using the Empirical formula.

SECTION – III

Q3. Attempt any five questions. All questions carry equal marks 5X10=50

- a) Prove that the relative error of Product of three non – zero numbers does not exceed the sum of the relative errors of the given numbers.
- b) Use the method of least squares to fit the straight line $Y = a + bx$ to following data

X :	0	1	2	3	4
Y :	2	5	8	11	14

- c) Find the Karl Pearson's coefficient of correlation for following data:

X :	102	109
Y :	50	48

d) Find the missing terms in the following table:

X :	0	1	2	3	4
Y :	1	2	5	—	17

e) Derive the Lagrange interpolation Formula. Find the value of $f(2.5)$ from following data:

X :	2	4	6	8	10
Y :	3	15	35	63	99

f) Evaluate $\int_0^1 \frac{1}{1+X} dx$

By using Trapezoidal rule take $n = 6$

g) Derive normal equation to $F_i + y = a + bx + cx^2$ using least square method.

h) Define skewness and Kurtosis. Calculate β_1 , β_2 , γ_1 and γ_2 for the following data and comment on the nature of the distribution.

X :	2	3	4	5	6
f :	1	3	7	2	1