Exam.Code:0029
Sub. Code: 0933

1128

Bachelor of Computer Application
Third Semester
BCA-301: Computer Based Numerical and Statistical Methods
(Old Syllabus 2016-17)

Time allowed: 3 Hours **Max. Marks: 90**

NOTE: *Attempt five questions in all, including Question No. IX (Unit-V) which is compulsory and selecting one question each from Unit I -IV.*

x-x-x

UNIT – I

I. a) Describe broad sources of errors in numerical computations. What do you mean by normalized floating point number? What are the advantages of normalizing floating point numbers?

b) Explain underflow and overflow conditions of error with suitable examples in floating point's addition and subtraction.

c) Find the absolute, relative, and percentage errors if x is rounded off to three decimal digits. Given x = 0.005998. (3x6)

II. a) Evaluate $\sqrt{12}$ to four decimal places by Newton-Raphson iterative method.

b) Use the method of false position to find the root of $x^3 - x - 4 = 0$. (9,9)

UNIT – II

a) Evaluate $I = \int_0^6 \frac{dx}{1+x^2}$ using

i) Simpson's one-third rule
ii) Simpson's three-eighth rule
iii) Trapezoidal rule

b) Find the solution to the following system of equations using the Gauss-Seidel method:

$$12x_1 + 3x_2 - 5x_3 = 1$$
$$x_1 + 5x_2 + 3x_3 = 28$$
$$3x_1 + 7x_2 + 13x_2 = 76$$

(9,9)

III. a) What is interpolation? Find the value *of sin 52^0 from the given table:-*

θ^0	45^0	50^0	55^0	60^0
Sin θ	0.7071	0.7660	0.8192	0.8660

b) Find the cubic Lagrange's interpolating polynomial from the following data:

x	0	1	2	3
F(x)	2	3	12	147

(9,9)

P.T.O.

UNIT – III

IV. a) Construct frequency distribution table (with 4 classes) for the data:-
80, 68, 84, 86, 85, 77, 64, 81, 93, 94, 97, 93, 89, 82, 76, 75, 83, 90, 83, 84, 92, 94, 90, *92,* 91, 84, 81, 84, 79, 80, 80.

b) Compare and contrast various measures of central tendency, giving the significance of each.

c) The mean age of 5 students of a class is 10 years. If one student is excluded from the class then the new mean age becomes 9 years. Find the age of the student who is excluded from the class. (3x6)

V. a) Find the variance and SD of the data 6.5, 6.6, 6.7, 6.8, 7.1, 7.3, 7.4, 7.7, 7.7, 7.7.

b) The number of stories in the 13 tallest buildings for two different cities is listed below. Which set of data is more variable (use coefficient of variation)?

Mumbai : 75, 71, 64, 56, 53, 55, 47, 55, 52, 50, 50, 50, 47
Delhi : 64, 54, 40, 32, 46, 44, 42, 41, 40, 40, 34, 32, 30

(9,9)

UNIT – IV

VI. Obtain a relation of the form $y = ab^x$ for the following data by the Method of Least Squares:

x	2	3	4	5	6
y	8.3	15.4	33.1	65.2	126.4

(18)

VII. Differentiate between linear and non-linear regression. Obtain the line of regression of y on x for the data given below:

x	1.53	1.78	2.60	2.95	3.42
y	33.50	36.30	40.00	45.80	53.50

(18)

UNIT – V

VIII. Attempt the following:-

a) Define the term 'absolute error'. Give example.

b) Explain the Bisection method to calculate the roots of an equation.

c) What is meant by numerical solution of ordinary differential equations?

d) What do you mean by numerical integration?

e) What is skewness measure in statistics?

f) Give limitations of statistical methods.

g) What are moments in Statistics?

h) Compare correlation analysis with regression analysis.

i) Define harmonic mean and its purpose. (9x2)

x-x-x