Exam.Code:0029
Sub. Code: 0933

1127

Bachelor of Computer Applications

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. 9 (Section-E) which is compulsory and selecting one question each from Section A-D. Non-programmable and non-storage type calculator is allowed. Log table may be allowed.*

*x-x-x*

**Section A**

Q 1. *a)* How a floating point number is stored in the memory of a computer?

*b)* Subtract the following two floating point numbers $0.36143447 \times 10^7$ and $0.36132346 \times 10^7$ and give the result in normalized floating point number.

*c)* Given that $\alpha$ is the only root of equation: $x^3 - x^2 - 6 = 0$:

*i)* Show that $2.2 < \alpha < 2.3$ (6, 6, 6 )

Q 2. *a)* What do you mean by roots of an equation? Explain Newton-Raphson method of evaluating roots of a non-linear equation.

b) Define error. Write and explain different errors arising due to numerical computations with suitable example.

(9, 9)

**Section B**

Q 3. *a)* Solve the below given equations using Gauss Elimination method:

$$x + y + z = 6$$
$$3x + 3y + 4z = 20$$
$$2x + y + 3z = 13$$

*b)* Discuss the Gauss Seidel method for the solution of simultaneous equations. What is Pivoting- Explain its use in Gauss Seidel Method?

(9, 9)

Q 4. *a)* Using Gauss – Jordan method, find inverse of the following:

$$\begin{bmatrix} 4 & 6 & 2 \\ 13 & 7 & 10 \\ 8 & 9 & 5 \end{bmatrix}$$

*b)* Find approximate value of following integral:

$$I = \int_1^2 \frac{dx}{x}$$

Using *i)* Trapezoidal Rule *ii)* Simpson 's Rule. (9, 9)

P.T.O

## Section C

Q 5. *a)* Construct a frequency distribution of following data, using 5 classes:

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 10 | 15 | 12 | 24 | 30 | 17 | 20 | 12 | 11 | 13 |
| 22 | 22 | 23 | 26 | 12 | 12 | 29 | 10 | 11 | 10 |

b) Find the mean, median and mode of a data set: 23, 63, 52, 29, 29, 55, 41, 36 and 34.

c) What is difference between mean and standard deviation?

(6, 6, 6)

Q 6. a) Write a program in C to compute mean, median and mode of a data set.

b) Explain the following in statistics with suitable example:

*i)* Harmonic Mean *ii)* Geometric Mean

(9, 9)

## Section D

Q 7. Fit a line $y = m.x + b$ ( by the method of least squares) to the following data:

| $x$ | 8 | 2 | 11 | 6 | 5 | 4 | 12 | 9 | 6 | 1 |
|---|---|---|---|---|---|---|---|---|---|---|
| $y$ | 3 | 10 | 3 | 6 | 8 | 12 | 1 | 4 | 9 | 14 |

Q 8. Write a program in C to implement linear regression algorithm.

(18, 18)

## Section E

Q 9. Define\ Explain the following terms:

*a)* Kurtosis
*b)* Relative Error
*c)* Role of Runga-Kutta Methods
*d)* Disadvantages of Bisection method
*e)* Cumulative Frequency
*f)* ill Conditioned
*g)* Skewness
*h)* Mantissa and Exponent
*i)* Usage of Birge – Vieta method

(9×2=18)

x-x-x