SM – 619

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**II Semester B.C.A. Examination, May/June 2018**
**(CBCS) (2014-15 and Onwards) (F+R)**
**COMPUTER SCIENCE**
**BCA 205 : Numerical and Statistical Methods**

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** Sections.*

SECTION – A

I. Answer **any ten** questions of the following : **(10×2=20)**

1) Subtract .9432E-4 from .5452E-3.

2) Mention four types of errors.

3) Write the formula for secant method.

4) Construct the difference table for the following :

| x | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| f(x) | 1 | 3 | 7 | 3 |

5) Write the Newton backward interpolation formula.

6) Explain Cholesky method of solving the linear equation of the form AX = B.

7) Write the Taylor's series expansion of f(x).

8) Write the formula for Harmonic mean for discrete series.

9) Find the coefficient of variation, given : arithmetic mean is 9.58 and standard deviation is 14.20.

10) Write the formula to calculate the coefficient of correlation for two groups.

11) Find the probability of getting a head in tossing a coin.

12) If $P(B) = \frac{1}{4}$ and $P(A \cap B) = \frac{3}{14}$, find P(A/B).

P.T.O.

## SECTION – B

II. Answer **any six** of the following : **(6×5=30)**

13) Find a real root of the equation $x^3 - 4x - 9 = 0$ using bisection method in four stages lies in the interval (2, 3).

14) Find f(1.4) from the following data :

| x | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| f(x) | 10 | 26 | 58 | 112 | 194 |

15) Find the polynomial of which satisfies the following data :

| x | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| f(x) | 3 | 6 | 11 | 18 | 27 |

16) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by Simpson's $\left(\frac{3}{8}\right)^{th}$ rule by taking h = 1.

17) By using Trapezoidal rule, evaluate $\int_0^1 \frac{dx}{1+x}$. Divide (0, 1) into six equal parts.

18) Solve the system of linear equation by using Crout's LU decomposition method :

$x_1 + x_2 + x_3 = 1$

$4x_1 + 3x_2 - x_3 = 6$

$3x_1 + 5x_2 + 3x_3 = 4$

19) Solve the system of linear equations by Cholesky method :

$x_1 + 2x_2 + 3x_3 = 5$

$2x_1 + 8x_2 + 22x_3 = 6$

$3x_1 + 22x_2 + 82x_3 = -10.$

20) Determine the single-precision and double precision machine representation of 492.788125.

## SECTION – C

III. Answer **any six** of the following : **(6×5=30)**

21) Solve the system of equations by Gauss-elimination method :

$x + 2y + z = 3$

$2x + 3y + 3z = 10$

$x + 10y - z = -22$

22) Solve the following system of equations by Gauss-Seidel method :

$x + y + 54z = 110$

$27x + 6y - z = 85$

$6x + 15y + 2z = 72$

23) Find the largest eigen value and the corresponding eigen vector of $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$. Do only five steps.

24) Use Taylor's series method to find y at $x = 0.2$ considering terms upto the third degree given $\frac{dy}{dx} = x^2 + y^2$ and $y(0) = 1$.

25) Solve $\frac{dy}{dx} = y - x^2$, $y(0) = 1$ by Picard's method upto the third approximation.

Hence find the value of $y(0.2)$.

26) By using Runge-Kutta method of 4th order, solve $\frac{dy}{dx} = x + y^2$, $y(0) = 1$ for $x = 0.2$.

27) Find the Arithmetic Mean (AM) from the following data by step deviation :

| **Marks** | 0 – 10 | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 | 50 – 60 |
|---|---|---|---|---|---|---|
| **No. of Students** | 10 | 5 | 30 | 25 | 10 | 20 |

28) State the prove Baye's theorem.

SECTION – D

IV. Answer **any four** of the following : **(4×5=20)**

29) Find the standard deviation from assumed mean method for the following data :

| C.I | 0 – 10 | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 | 50 – 60 | 60 – 70 |
|---|---|---|---|---|---|---|---|
| f | 1 | 4 | 17 | 45 | 26 | 5 | 2 |

30) Find the coefficient of skewness for the following data :

| Variable | 0 – 5 | 5 – 10 | 10 – 15 | 15 – 20 | 20 – 25 | 25 – 30 | 30 – 35 | 35 – 40 |
|---|---|---|---|---|---|---|---|---|
| Frequency | 2 | 5 | 7 | 13 | 21 | 16 | 8 | 3 |

31) Find the rank correlation coefficient for the following data :

| x | 65 | 45 | 67 | 38 | 48 | 50 | 26 | 47 | 70 | 62 |
|---|---|---|---|---|---|---|---|---|---|---|
| y | 64 | 40 | 58 | 46 | 52 | 49 | 38 | 47 | 59 | 60 |

32) If A and B are two events with $P(A) = \frac{5}{8}$, $P(B) = \frac{3}{8}$ and $P(A \cup B) = \frac{1}{8}$. Find :

i) P(not A), ii) P(not B), iii) P(A/B), iv) P(B/A).

33) If A and B are two events then prove that $P(A/\bar{B}) = \frac{P(A) - P(A \cap B)}{1 - P(B)}$, where $P(B) \neq 1$.

34) Obtain the function of the normal probability curve to the following data :

| $X_i$ | 2 | 4 | 6 | 8 | 10 |
|---|---|---|---|---|---|
| $f_i$ | 1 | 4 | 6 | 4 | 1 |