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 $P(B) = \dfrac{1}{4}$ and $P(A \cap B) = \dfrac{3}{14}$, 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 $\int_0^6 \dfrac{dx}{1+x^2}$ by Simpson's $\left(\dfrac{3}{8}\right)^{th}$ rule by taking h = 1.

17) By using Trapezoidal rule, evaluate $\int_0^1 \dfrac{dx}{1+x}$. 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 $\dfrac{dy}{dx} = x^2 + y^2$ and $y(0) = 1$.

25) Solve $\dfrac{dy}{dx} = y - x^2$, $y(0) = 1$ 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 $\dfrac{dy}{dx} = x + y^2$, $y(0) = 1$ 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 $P(A) = \dfrac{5}{8}$, $P(B) = \dfrac{3}{8}$ and $P(A \cup B) = \dfrac{1}{8}$. 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 $P\left(A / \bar{B}\right) = \dfrac{P(A) - P(A \cap B)}{1 - P(B)}$, 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