



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 $\left(\frac{3}{8}\right)^{\text{th}}$ 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

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}. \text{ Do only five steps.}$$

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) $P(\text{not } A)$, ii) $P(\text{not } B)$, 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