



SE – 340

II Semester B.C.A. Examination, September 2020
(CBCS) (F + R) (2014-15 and Onwards)
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 .5424E-99 from .5452E-99.
- 2) Define Inherent Error and Round-off error.
- 3) Write the formula for Secant – Method.
- 4) Construct the divided difference table for

| | | | | |
|----------|----|---|----|-----|
| x | 0 | 2 | 3 | 6 |
| y | -4 | 2 | 14 | 138 |

- 5) Write Lagrange Interpolation formula.
- 6) Write Taylor's Series Expansion of $f(x)$.
- 7) Explain Gauss-Elimination method for solving system of Linear Equations.
- 8) Find the value of the Median from the following 8, 10, 11, 13, 15, 16, 18.
- 9) Define Skewness.
- 10) If A and B are events with $P(A) = 3/8$, $P(B) = 5/8$, $P(A \cup B) = 3/4$. Find $P(A/B)$.
- 11) Define correlation.
- 12) Find the probability of getting a tail in tossing of two coins simultaneously.

P.T.O.



SECTION - B

II. Answer **any six** of the following :

(6×5=30)

13) Determine the single precision and double precision machine representation of -42.234375 .

14) Find square root of 17 in 5 stages using Bisection method in the interval (4, 5).

15) Using Newtons Backward difference formula find $f(7.5)$ from the following data.

| | | | | | | | | |
|-------------|---|---|----|----|-----|-----|-----|-----|
| x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| f(x) | 1 | 8 | 27 | 64 | 125 | 216 | 343 | 512 |

16) Find $f(10)$ using Lagrange's formula for the following data.

| | | | | |
|-------------|----|----|----|----|
| x | 5 | 6 | 9 | 11 |
| f(x) | 12 | 13 | 14 | 16 |

17) Evaluate $\int_0^{\pi/2} \sqrt{\sin \theta}$ using Simpson's $1/3^{\text{rd}}$ rule taking six equal intervals.

18) Evaluate $\int_0^1 \frac{dx}{1+x}$ using Trapezoidal rule.

19) Solve by Jacobi's iteration method :

$$10x + y + z = 12$$

$$2x + 10y + z = 13$$

$$2x + 2y + 10z = 14$$

20) Use LU decomposition method to solve the following set of equations.

$$x + y + 5z = 16$$

$$2x + 3y + z = 4$$

$$4x + y - z = 4$$



SECTION - C

III. Answer **any six** of the following :

(6×5=30)

21) Solve by Gauss-Seidal iteration method.

$$20x + y - 2z = 17$$

$$3x + 20y - z = -18$$

$$2x - 3y + 20z = 25$$

22) Find the largest eigen value and the corresponding eigen vector of the matrix by using power method.

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

23) Using Picard's method, solve $\frac{dy}{dx} = x^2 + y^2$ with $y = 0$ when $x = 0$.

Find $y(0.1)$ correct to four decimal places.

24) Solve by using Runge Kutta method $\frac{dy}{dx} = x + y$ with initial condition $y = 1$ when $x = 0$ for $x = 0.2$.

25) Using Taylor's series method find y at $x = 0.2$ correct to four decimal places if $y(x)$ satisfies $\frac{dy}{dx} = x - y^2$ and $y(0) = 1$.

26) Calculate Mean by Step-deviation method.

| | | | | | | |
|------------------|--------|---------|---------|---------|---------|---------|
| Class | 1 - 10 | 11 - 20 | 21 - 30 | 31 - 40 | 41 - 50 | 51 - 60 |
| Frequency | 3 | 16 | 26 | 31 | 16 | 8 |

27) Find the Geometric mean for the data.

| | | | | | | | |
|-------------|--------|---------|---------|---------|---------|---------|---------|
| C.I. | 7 - 10 | 10 - 13 | 13 - 16 | 16 - 19 | 19 - 22 | 22 - 25 | 25 - 28 |
| f | 5 | 9 | 19 | 23 | 7 | 4 | 1 |

28) State and prove Baye's Theorem.



SECTION - D

IV. Answer **any four** of the following.

(4×5=20)

29) Calculate standard deviation for the data given.

| | | | | | | | |
|----------|---|----|----|----|----|----|----|
| x | 6 | 12 | 18 | 24 | 30 | 36 | 42 |
| f | 4 | 7 | 9 | 18 | 15 | 10 | 5 |

30) Compute co-efficient of skewness for the data 25, 15, 23, 40, 27, 25, 23, 25, 20.

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

32) A random variable X has the following probability function :

| | | | | | | | | |
|-------------|---|---|----|----|-------|-------|--------|------------|
| x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| P(x) | 0 | K | 2K | 3K | K^2 | K^2 | $2K^2$ | $7K^2 + K$ |

- i) Find value of K
 - ii) Evaluate $P(X < 6)$
 - iii) $P(X \geq 6)$.
- 33) Ten coins are tossed simultaneously. Find the probability of getting at least seven heads.
- 34) If A and B are two events with $P(A \cup B) = 7/8$, $P(A \cap B) = 1/4$, $P(\bar{A}) = 5/8$.
Find :
- i) $P(A)$
 - ii) $P(A \cap \bar{B})$
 - iii) $P(B)$.