S–5759

Sub. Code
23BCA1C1

B.C.A. DEGREE EXAMINATION, APRIL 2025

First Semester

Computer Applications

PYTHON PROGRAMMING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is Indentation?

2. Comment on Variable and Expression.

3. What does python continue statement?

4. Give a note on the break statement.

5. How to import statements?

6. What does recursive function implies?

7. How to slice a list in Python?

8. Classify the Python accessing elements in Tuples.

9. How to open a new file in Python?

10. Point out different modes of file opening.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) State any Five features of python.

Or

(b) Write a python program to calculate total and average marks based on input.

12. (a) Write a Python program to find the sum of N natural numbers.

Or

(b) Explain the syntax of the following statements (i) For Loop (ii) While Loop.

13. (a) Summarize the scope of a variable in a function.

Or

(b) Describe python modules.

14. (a) Explain the basic Tuple operations with examples.

Or

(b) Identify the various methods used to delete the elements from the dictionary.

15. (a) Write a program to count the total number of uppercase characters in a file in Python.

Or

(b) Discover syntax for reading from a file.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. List various types of operators in Python and write any four types of operators.

17. Explain the different types of conditional control statements with suitable examples.

18. Summarize different kinds of function arguments.

19. Analyze the basic list operations in detail with necessary programs.

20. Explain in detail about Python Files, its types, functions and operations with examples.

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S–5760

Sub. Code
23BCAA1

U.G. DEGREE EXAMINATION, APRIL 2025

Computer Applications

Allied — DIGITAL LOGIC FUNDAMENTALS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Define a number system.
2. Convert the decimal number 25 into its binary equivalent.
3. State DeMorgan's Theorems in Boolean algebra.
4. What is a K-map (Karnaugh map) and what is it used for?
5. What is the primary function of a multiplexer in combinational logic circuits?
6. How does a demultiplexer differ from a multiplexer?
7. What is the basic function of an RS flip-flop in sequential logic circuits?
8. How does a JK flip-flop differ from an RS flip-flop?
9. What is the difference between asynchronous and synchronous counters?
10. Define a ripple counter.

Part B (5 × 5 = 25)

Answer **all** the questions choosing either (a) or (b).

11. (a) Explain the process of converting a binary number into its decimal equivalent with an example.

Or

(b) Demonstrate the steps to convert a binary number to a BCD (Binary-Coded Decimal).

12. (a) Explain how the K-map method simplifies Boolean functions with an example.

Or

(b) Illustrate the process of binary addition and binary subtraction using 4-bit binary numbers.

13. (a) Discuss the application of decoders in digital systems, with an example of a 3-to-8 decoder.

Or

(b) How do parity generators and checkers help in error detection? Provide an example.

14. (a) Describe the operation of an RS flip-flop with its truth table.

Or

(b) Explain the working principle of a JK flip-flop and its application in digital circuits.

15. (a) Discuss about the operation of an up-down counter and give an example of its application.

Or

(b) Describe about various types of ROM.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Describe the different types of binary codes (such as BCD, Gray code, and ASCII) and explain their importance in digital electronics.

17. Compare and contrast the SOP and POS methods in Boolean algebra.

18. Explain the working methodology and applications of multiplexers and demultiplexers in digital circuits.

19. Describe the different types of shift registers and their applications in digital systems.

20. Discuss in detail about the types of RAM.

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S–5761

Sub. Code
23BCA1S1

B.C.A. DEGREE EXAMINATION, APRIL 2025

First Semester

Computer Applications

WEB DESIGNING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Write a syntax to give a title for a html form.

2. Anchor tag-Write a note on it.

3. "HTML form is interactive form." Justify this statement.

4. How will you add a GIF file in a web page?

5. Explain the styling rule in CSS.

6. Does XML separate presentation from Data?

7. How DHTML differs from HTML?

8. What is the use of dynamic Positioning in JavaScript?

9. List the objects in JavaScript.

10. How do web browsers run in JavaScript?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) When will we use multiple text entry over a single line text entry?

Or

(b) Write a html code to get the following output.

Name : [ ]

Email : [ ]

Address : [ ]

Pincode : [ ]

12. (a) Write a html code to add a audio file in a webpage.

Or

(b) List the elements that can be used in the HTML form in web page creation.

13. (a) Write a CSS code to print in blue color with center alignment.

"WEB **DESIGNING IS AN ART**"

Done by

CASCADING STYLE SHEETS

Or

(b) List the advantages of XML.

14. (a) Write a JavaScript code to find the given number is odd or even.

Or

(b) JavaScript is client side scripting language – Explain.

15. (a) List Advantages of DCOM over DOM.

Or

(b) Why primitive types of JavaScript are not considered as objects?

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Write a HTML code to create two Frames in HTML form with a perfect example.

17. Explain the step by step creation of HTML form.

18. Elaborate the four elements of DHTML.

19. Explain the propagation of events bubbling with example.

20. Illustrate the working of a web browser environment in JavaScript.

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S–5762

Sub. Code
23BCA1FC

B.C.A. DEGREE EXAMINATION, APRIL 2025

First Semester

Computer Applications

STRUCTURED PROGRAMMING IN C

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define the term variable and constant.

2. What are bitwise operators?

3. Specify the syntax used for 'for' statement.

4. Mention the use of 'break' and 'continue' statements.

5. What are the types of arrays?

6. How to initialize two dimensional arrays?

7. What are the four types of function arguments?

8. What is recursive function? Give an example.

9. How to declare pointer variable?

10. How to declare pointer with array variable?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) What are basic data types supported in the C Programming Language?

Or

(b) Explain Arithmetic and logical operators.

12. (a) Explain if, if-else, nested if-else with examples and syntax.

Or

(b) Explain the different types of loops in C with syntax.

13. (a) What is an array? How a single dimension and two dimension arrays are declared and initialized?

Or

(b) Write a program for sum of *n* numbers using array.

14. (a) Write a program for adding two numbers using user defined functions based on parameter passing and return value.

Or

(b) What is recursion? Explain. Write a C-program using recursive function to finding factorial number.

15. (a) What is a pointer? Explain how the pointer variable declared and initialized.

Or

(b) Write a program in C to find the sum and mean of all elements in an array using pointers.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain all the types of operators with example.

17. How to declare do-while and switch-case expressions with example program.

18. Write a program for Matrix addition using two dimensional arrays.

19. What is function? Explain different classification of user defined functions based on parameter passing and return type with examples.

20. Explain the concept of Pointer to Multidimensional Arrays.

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S–5763

Sub. Code
23BCA2C1

B.C.A. DEGREE EXAMINATION, APRIL 2025

Second Semester

Computer Applications

OBJECT ORIENTED PROGRAMMING CONCEPTS USING C++

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Explain the uses of C++.

2. Write the structure of C++ program.

3. How to declare main function in C++.

4. Write a simple syntax of math library functions.

5. What is constructor?

6. Explain defined derived class.

7. Write the importance of the pointers.

8. Give a short note on virtual function.

9. Simply explain the importance of function templates.

10. What is error handling function?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) How data types are classified in C++? Explain it.

Or

(b) Explain Keywords Identifiers.

12. (a) Briefly explain the In Line function.

Or

(b) Write a note on nesting of member function.

13. (a) Explain the importance of multiple constructors in class.

Or

(b) Give a note on Copy constructor with sample program.

14. (a) Describe the pointers to derived class with syntax.

Or

(b) Explain the Opening and closing file methods with suitable examples.

15. (a) Write a simple program on Nesting of Function Call.

Or

(b) Give a note on Catch All Exceptions.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Elaborately explain various control structure available in C++.

17. Illustrate friend and virtual functions with examples.

18. Explain the construction of two dimensional arrays with sample program.

19. Describe the Sequential Input and Output Operations with syntax.

20. Discuss the Exceptions in Constructor and Destructor.

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S–5765

Sub. Code
23BCA2S1

B.C.A. DEGREE EXAMINATION, APRIL 2025

Second Semester

Computer Applications

FUNDAMENTALS OF INFORMATION TECHNOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is a Data?

2. Write a about CPU.

3. What is a Document?

4. Write short notes on watermark.

5. Explain about a cell in Excel.

6. Explain chart in Excel.

7. What is the use of an animation?

8. Explain shortly about a multimedia.

9. Write short notes on Digital Currency.

10. What is an E-Mail?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Describe the Output devices.

Or

(b) Explain the components of computer.

12. (a) Describe how to create a Header and Footer using MS-Word.

Or

(b) How to format a Text using MS-Word?

13. (a) How to insert an Functions in MS-Excel?

Or

(b) How to insert a rows and columns in MS-Excel.

14. (a) How to customize a Template in MS-PowerPoint.

Or

(b) Explain the types of Animations in MS Power Point.

15. (a) Explain the search engines.

Or

(b) Explain how to send a group mail.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the generation of computers.

17. Describe Mail merge in MS-Word.

18. Explain how to create a chart in MS-Excel.

19. Illustrate how to create and work with a slides show in MS-power point.

20. Describe an E-Commerce

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S–5766

Sub. Code
23BCA2S2

B.C.A. DEGREE EXAMINATION, APRIL 2025

Second Semester

Computer Applications

MULTIMEDIA SYSTEMS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define Multimedia.

2. What is meant by Hypertext?

3. Define Palettes.

4. What are audio devices?

5. Define Animation.

6. State any two capabilities of video editing software.

7. Mention any two input devices used for Multimedia Production.

8. Define two Operating System platforms most often used in multimedia development.

9. List the skills need for creating multimedia content.

10. Expand RFP.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Give a short note on multimedia and its application.

Or

(b) Describe the different types of hypermedia structures.

12. (a) Write a short note on Still Images.

Or

(b) Summarize about the power of sound in multimedia.

13. (a) Illustrate the working of Video.

Or

(b) Give a note on video delivery methods.

14. (a) Explain the different types of hardware compounds required for multimedia.

Or

(b) State the role Multimedia production team.

15. (a) Brief note on Delivering multimedia contents.

Or

(b) List out the members of the design team. Explain.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain different Font Editing and Design tools.

17. Compare and contrast the use of MIDI and digitized audio in multimedia production.

18. Outline the important considerations in shooting and editing video for use in multimedia.

19. Elaborate on different stages of a multimedia project.

20. Discuss in detail the design process in multimedia project.

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S–5767

Sub. Code
23BCAA3

U.G. DEGREE EXAMINATION, APRIL 2025

Computer Applications

Allied – DISCRETE MATHEMATICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. If $A = \{\alpha, \beta\}$ and $B = \{1, 2, 3\}$ then what is $(A \times B) \cap (B \times A)$?

2. What do you mean by injective mapping?

3. Construct truth table for $(- P) \vee (- Q)$

4. Define tautology.

5. What is PDNF of $\left(P \vee \urcorner Q\right)$.

6. What do you mean by existential quantifiers?

7. When do you say two graphs are isomorphic?

8. Define adjacency matrix.

9. Define a spanning tree.

10. What is meant by Boolean function of degree n.

Part B $(5 \times 5 = 25)$

Answer **all** questions choosing either (a) or (b).

11. (a) Use Venn diagram to prove the following.

(i) $(A \cap B) - C = (A - C) \cap (B - C)$

(ii) $(A - B) - C = A - (B \cup C)$.

Or

(b) Let $X = \{1, 2, 3, 4, 5, 6, 7\}$ and $R = \{(\langle x, y \rangle) | x - y$ is divisible by 3$\}$. Show that R is an equivalence relation and draw the graph of R.

12. (a) Check whether the following statement is tautology or not.

$(P \to (Q \to R)) \to ((P \to Q) \to (P \to R))$.

Or

(b) Produce the substitution instances of the following formulas for the given substitution

$(((P \to Q) \to P) \to P)$; substitute $(P \to Q)$ for P and $((P \wedge Q) \to R)$ for Q.

13. (a) Show that $R \wedge (P \vee Q)$ is a valid conclusion from the premises $P \vee Q, Q \to R, P \to M$ and $\neg M$.

Or

(b) If the universe of discourse is the set $\{a, b, c\}$, eliminate the quantifiers in the following formula,

(i) $(x)R(x) \wedge S(x)$

(ii) $(x)(P(x)) \to Q(x)$.

14. (a) Prove that the number of edges in a bipartite graph with n vertices is almost $\left(\frac{n^2}{2}\right)$.

Or

(b) Draw the graphs represented by the following adjacency matrices

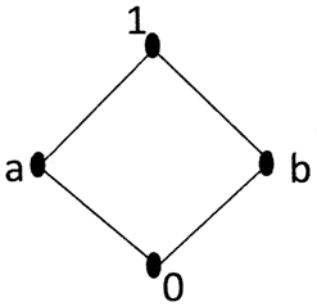
(i) $\begin{bmatrix} 1 & 2 & 0 & 1 \\ 2 & 0 & 3 & 0 \\ 0 & 3 & 1 & 1 \\ 1 & 0 & 1 & 0 \end{bmatrix}$

(ii) $\begin{bmatrix} 0 & 1 & 1 & 1 \\ 1 & 0 & 1 & 0 \\ 1 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix}$

15. (a) Explain Kruskal's algorithm with an example.

Or

(b) Find the value of $x_1 * x_2 * [(x_1 * x_4) \oplus x_2' \oplus (x_3 * x_1')]$ for $x_1 = a, x_2 = 1, x_3 = b, x_4 = 1$ where $a, b, 1 \in B$ and the Boolean algebra $\langle B, *, \oplus', 0, 1 \rangle$ is shown the figure.



Part C (3 × 10 = 30)

Answer any **three** questions.

16. Let $f : X \to Y$ and $g : Y \to X$. Prove that the function g is equal to f^{-1} only if $g \circ f = I_x, f \circ g = I_y$.

17. Write an equivalent formula for

    (a) $P \wedge (Q \rightleftarrows R) \vee R(\rightleftarrows P)$ which does not contain the biconditional.

    (b) $P \wedge (Q \rightleftarrows R)$ which contains neither the biconditional nor the conditional.

18. Show that the following argument is valid: "Every microcomputer has a serial interface port. Some Microcomputers have a parallel port. Therefore, some microcomputers have both serial interface port and parallel port."

19. Let *A* be the adjacency matrix of a digraph *G*. Prove that, the element in the i^{th} row and j^{th} column of A^n (n is nonnegative integer) is equal to the number of paths of length n from the i^{th} node to j^{th} node.

20. Discuss in detail about Dijikstra's algorithm with suitable example.

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S–5768

Sub. Code
23BCAA4

U.G. DEGREE EXAMINATION, APRIL 2025

Computer Applications

Allied — STATISTICS METHODS AND ITS APPLICATIONS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** the questions.

1. Write down the important types of classification.
2. What is a Frame?
3. What is the relationship between mean, median and mode?
4. An aeroplane flies along the four sides of a square at speeds of 100, 200, 300 and 400 kilometers per hour respectively. What is the average speed of the plane in its flight around the square?
5. Define leptokurtic.
6. Write the formula for r^{th} central moment.
7. What is meant by correlation?
8. Explain positive correlation.
9. Find the average values from $8x - 10y + 66 = 0$, $40x - 18y = 214$.
10. State the relation between correlation coefficient and regression coefficient.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) What are the uses and limitations of statistics?

Or

(b) Draw less than and more than cumulative frequency curve for the following :

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	3	9	15	30	18	5

12. (a) Calculate the median from the following data :

Marks :	10-25	25-40	40-55	55-70	70-85	85-100
Frequency :	6	20	44	26	3	1

Or

(b) Calculate standard deviation from the data :

x	10	11	12	13	14
f	3	12	18	12	3

13. (a) The first four moments of a distribution about $x = 2$ are 1, 2.5, 5.5 and 16. Calculate the four moments of the mean.

Or

(b) Find β_2 for the following :

Class :	0-10	10-20	20-30	30-40
F :	1	3	4	2

14. (a) Find the rank correlation of the following :

Statistics :	1	2	3	4	5	6	7	8	9	10
Mathematics :	2	4	1	5	3	9	7	10	6	8

Or

(b) Ten students obtained the following percentage of marks in the college internal test x and in the final university examination (y). Find the correlation coefficient between the marks of the two tests.

X	51	63	63	49	50	60	65	63	46	50
Y	49	72	75	50	48	60	70	48	60	56

15. (a) Find out the regression equations x on y from the following data :

x	10	20	30	40	50	60	70
y	11	25	35	43	60	67	74

Or

(b) From the following data calculate :

(i) the coefficient of correlation

(ii) standard deviation of y (σ_y) given $b_{xy} = 0.95$; $b_{yx} = 0.99$.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain briefly about methods of sampling.

17. Find the :

(a) mean

(b) median

(c) 9th decile for the following frequency distribution.

Class :	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55
Frequency :	8	15	39	47	52	41	28	16	4

18. Calculate the Karl Pearson's coefficient of skewness.

Wages in Rs.	10	11	12	13	14	15
Frequency	2	4	10	8	5	1

19. Three judges assign the ranks of 8 entries in a beauty contest. Which pair of judges has the nearest approach to common taste in beauty?

Judge Mr. *X*	1	2	4	3	7	6	5	8
Judge Mr. *Y*	3	2	1	5	4	7	6	8
Judge Mr. *Z*	1	2	3	4	5	7	8	6

20. The following data relate to the marks of 10 students in the internal test and the University examination for the maximum of 50 in each.

Internal marks	25	28	30	32	35	36	38	39	42	45
University marks	20	26	29	30	25	18	26	35	35	46

(a) Obtain the two regression equations and determine.

(b) The most likely internal mark for the University mark of 25.

(c) The most likely university marks for the internal mark of 30.

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S–5769

Sub. Code
23BCAA5

U.G. DEGREE EXAMINATION, APRIL 2025

Computer Applications

Allied – GRAPH THEORY AND ITS APPLICATIONS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. When do you say that two graphs are isomorphic? Give an example.

2. Define Binary Tree.

3. What is meant by a fundamental graph?

4. What is 2-isomorphism?

5. What is edge covering?

6. What is a complete digraph?

7. Define the Euler circuit with an example.

8. What do you mean by a Quotient graph?

9. List the applications of coloring of a graph.

10. Why do we use shortest-path algorithms?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Prove that if a graph (Connected or disconnected) has exactly two vertices of odd degree there must be a path joining these two vertices.

Or

(b) Prove that the number of vertices in a binary tree is always odd.

12. (a) Explain about Combinatorial and geometric graphs.

Or

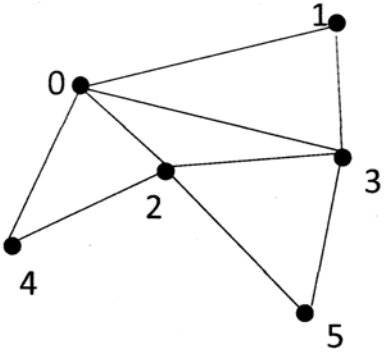
(b) Prove that the vertex connectivity of any graph can never exceed the edge connectivity.

13. (a) Prove that every tree with two or more vertices is 2-chromatic.

Or

(b) Prove that a digraph G is an Euler digraph if and only if G is connected and is balanced. Draw an example for Euler digraph of 6 vertices.

14. (a) Define the adjacency matrix and write the adjacency matrix for the following graph



Or

(b) Discuss the structure of the weighted graph with examples.

15. (a) Discuss the algorithm for the shortest path between all pairs of vertices.

Or

(b) Explain the concept of connected components on a graph with an example.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Prove that,

(a) A graph G is a tree if and only if there is one and only one path between every pair of vertices.

(b) A graph G is a tree if and only if it is minimally connected.

17. Prove that the ring sum of any two cut sets in a graph is either a third cut set or an edge-disjoint union of cut sets.

18. Given k and k-coloring of a k-chromatic graph, prove that for any color c there is a vertex of color c which is adjacent to vertices of every other color.

19. Explain Kruskal's minimal spanning tree algorithm with examples.

20. Discuss the traveling salesman problem of the undirected graph with a suitable example.

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S–5770

Sub. Code
23BCAA6

U.G. DEGREE EXAMINATION, APRIL 2025

Computer Applications

Allied – COMPUTER ORIENTED NUMERICAL METHODS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Write the iterative formula of Newton-Raphson Method.

2. Define pivot element.

3. Give the formula of Gauss Seidel method.

4. Give the inverse of Lagrange's interpolation formula.

5. State Gregory-Newton forward difference interpolation formula.

6. Form the forward difference table for the following data

X	0	1	2	3	4
Y	8	11	9	15	6

7. Define numerical differentiation.

8. What is the error of Simpson's one third rule?

9. What is single step Method?

10. Write the Runge-Kutta second order method and stability interval.

Part B $(5 \times 5 = 25)$

Answer **all** questions choosing either (a) or (b).

11. (a) Find the positive root of $x^3 - x = 1$ correct to four decimal places by bisection method.

Or

(b) Apply Gauss-Jordan method to find the solution of the following system

$10x + y + z = 12$; $2x + 10y + z = 13$ and $x + y + 5z = 7$.

12. (a) Using Lagrange's interpolation formula, find the form of the function $y(x)$ from the following table

X	0	1	3	4
Y	–12	0	12	24

Or

(b) Find the largest eigen value of the following matrix by using the power method $\begin{pmatrix} 4 & 2 \\ 1 & 3 \end{pmatrix}$.

13. (a) If $y(75) = 246$, $y(80) = 202$, $y(85) = 118$, $y(90) = 40$ find $y(79)$.

Or

(b) Given $u_0 = 2$, $u_1 = 11$, $u_2 = 80$, $u_3 = 200$, $u_4 = 100$, $u_5 = 8$, find $\nabla^5 u_5$.

14. (a) Find the first and second derivative of the function tabulated below at $x = 0.6$.

X	0.4	0.5	0.6	0.7	0.8
Y	1.5836	1.7974	2.0442	2.3275	2.6511

Or

(b) Evaluate $\int_0^5 \frac{dx}{4x+5}$ by Trapezoidal rule using 11 coordinates.

15. (a) Using Taylor series method, find correct to three decimal places, the value of $y(0.1)$, given $\frac{dy}{dx} + 2xy = 1$, $y_0 = 0$.

Or

(b) Using Euler's Method solve $dy/dx = 1 + xy$ with $y(0) = 2$. Find $y(0.1)$, $y(0.2)$ and $y(0.3)$.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Find the real root of the equation $\cos x = 3x - 1$ correct to four decimal places using successive approximation method.

17. Solve, by Gauss Seidel method, the following system: $28x + 4y - z = 32$; $x + 3y + 10z = 24$ and $2x + 17y + 4z = 35$.

18. From the data given below, find the number of students whose weight is between 60 and 70,

Weight:	0-40	40-60	60-80	80-100	100-150
No. of student:	250	120	100	70	50

19. Evaluate $I = \int_0^1 \frac{1}{1+x}\,dx$, correct to three decimal places by using trapezoidal rule and Simpson's rule with $h = 0.5, 0.25$ and 0.125.

20. Solve $\frac{dy}{dx} = y - x$, $y(0) = 2$, find $y(0.1)$ and $y(0.2)$ correct to four decimal places by using Runge-Kutta 2nd order and 4th order method.

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Sub. Code
23BCA3C1

B.C.A. DEGREE EXAMINATION, APRIL 2025

Third Semester

Computer Applications

DATA STRUCTURES AND ALGORITHMS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is the primary difference between a singly linked list and a doubly linked list?

2. What are the advantages of using a linked list over an array?

3. What is a Stack ADT, and what are its primary operations?

4. Define the term "push" in the context of stack operations.

5. What is an AVL tree, and why is it important?

6. Define a heap and explain its basic properties.

7. What is a graph?

8. Define a cut vertex in a graph.

9. What is the purpose of hashing?

10. Write down any two search methodology.

Part B (5 × 5 = 25)

Answer **all** the questions choosing either (a) or (b).

11. (a) Describe the advantages and disadvantages of using an array-based implementation for a List ADT.

Or

(b) Explain the process of inserting a node in a singly linked list. Provide an example.

12. (a) Describe the process of evaluating an arithmetic expression using a stack with an example.

Or

(b) Discuss the enqueue and dequeue operations in a circular queue, with examples.

13. (a) Discuss the process of inserting a node into a Binary Search Tree (BST).

Or

(b) Describe the concept of a threaded binary tree and its advantages over a regular binary tree.

14. (a) Discuss the Depth-First Traversal (DFS) method.

Or

(b) What is topological sorting in a graph, and under what conditions can it be applied? Provide an example.

15. (a) Write a note on Linear Search.

Or

(b) Discuss shortly on Radix sort.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the concept of a circularly linked list.

17. Design an algorithm to evaluate a arithmetic operations using stacks.

18. Discuss the concept of a Binary Search Tree.

19. Explain in detail about topological sorting.

20. Elaborate bubble sort and its algorithm.

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B.C.A. DEGREE EXAMINATION, APRIL 2025

Third Semester

Computer Applications

SOFTWARE TESTING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define software testing.
2. List out the purpose of testing.
3. What is flow/graph?
4. Write the various testing techniques?
5. What is quality? Write a few standards for quality.
6. Why test cases are important in software.
7. Define structural testing.
8. Write any two rules of Boolean algebra.
9. What is path expression?
10. Show states and its graph by diagram?

Part B (5 × 5 = 25)

Answer **all** the questions choosing either (a) or (b).

11. (a) Write a short note on a model for testing.

Or

(b) Define bug. List its types.

12. (a) Write a program to add two numbers and test its flow using path testing.

Or

(b) Write any three differences between white box and black box testing.

13. (a) In short describe domains and paths.

Or

(b) What are transaction flow techniques based on walkthroughs?

14. (a) Write a short note on decision tables with examples.

Or

(b) Draw a control flow diagram for a program based on conditional statements.

15. (a) What is syntax testing? Explain in detail.

Or

(b) Write in detail on structural metrics.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write short notes on software testing and debugging.

17. Explain in detail on transaction flow testing techniques.

18. What is data flow testing? Explain its strategies.

19. Brief the concepts on path products and path expressions.

20. Detail on transition testing based on states and graphs.

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	23BCA3S2

B.C.A. DEGREE EXAMINATION, APRIL 2025

Third Semester

Computer Applications

BIO METRICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What are the different types of biometric traits used in authentication?

2. Define Neural Networks.

3. What is purpose of using Iris recognition system?

4. Define Minutiae Extraction.

5. What do you mean by Multimodal Biometrics?

6. Define Soft Biometrics.

7. What do you mean by Watermarking in Digital Content?

8. What is the purpose of using Image Watermarking?

9. List down various applications of Biometrics.

10. Define API.

Part B (5 × 5 = 25)

Answer **all** the questions choosing either (a) or (b).

11. (a) How is biometric matching performed, and what are the key steps involved?

Or

(b) What are the different methods used for face recognition, and how do they work?

12. (a) Briefly explain process of capturing and analyzing vein patterns in the palm for biometric identification.

Or

(b) What are the advantages and limitations of fingerprint biometrics for identification?

13. (a) Explain in brief on the primary privacy concerns associated with biometric deployments?

Or

(b) Discuss techniques for enhancing privacy in biometric systems.

14. (a) Describe briefly on basic components of Watermarking techniques.

Or

(b) What metrics are used to evaluate the performance of watermarking techniques, explain briefly?

15. (a) Explain the role of Biometrics in Border security controls.

Or

(b) Discuss in detail on DNA Biometrics.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. What is the role of neural networks in face recognition and what are the advantages of using them?

17. Explain the process of iris segmentation, including methods for separating the iris from other parts of the eye.

18. Explain the concept of privacy concerns in biometric systems.

19. Explain in detail on watermarking Algorithm.

20. Explain with suitable example Biometric template interoperability.

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23BCA4C1

B.C.A. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Computer Applications

PROGRAMMING IN JAVA

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What are the fundamental principles of Object-Oriented Programming?

2. Define Inheritance and Polymorphism in Java.

3. What is purpose of using This and Super Keyword in Inheritance?

4. What is the difference between Method overloading and Method Overriding?

5. What do you mean by synchronization in threads?

6. Define Stream classes in java.

7. What do you mean by Components and Containers in AWT?

8. Define Events in Java.

9. What is the primary function of a JFrame?

10. What is the role of a JLabel in a GUI?

Part B (5 × 5 = 25)

Answer **all** the questions, choosing either (a) or (b).

11. (a) What is Type Conversion and when it is necessary to use? Explain in brief.

Or

(b) Explain the String buffer classes in Java.

12. (a) Briefly explain Hierarchical Inheritance with suitable example program.

Or

(b) How are Interfaces implemented using Classes. Explain briefly.

13. (a) What is meant by Runnable Interfaces? Explain in brief.

Or

(b) Explain the character stream classes in Java.

14. (a) Describe briefly on buttons, text components, checkboxes in AWT controls.

Or

(b) What are adapter classes and inner classes? How can they be used to simplify event handling?

15. (a) How to create a simple GUI using Swing components? Explain with example.

Or

(b) What are the main use cases for Jbuttons, JToggleButtons and JCheckBoxes?

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. What are control statements, and how are they used to control the flow of execution in Java?

17. Elucidate the use of Interfaces in java with appropriate example.

18. How do you read input from the console and write output to the console in Java? Explain in detail.

19. How do you customize the color and font of components within an AWT application? Explain with appropriate program.

20. Explain with suitable example on JCheck box and JRadiobutton.

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B.C.A. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Computer Applications

PHP PROGRAMMING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is a dynamic website?

2. What is the difference between XAMPP and WAMP?

3. How do you embed PHP in HTML?

4. What are the variables in PHP?

5. How does the while() loop work in PHP?

6. What is an array in PHP?

7. What is the function used to write data in a file?

8. Explain the importance of reading data from a file in PHP.

9. What is a cookie in PHP?

10. What is $_ GET and $_ POST in PHP?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Describe the basic knowledge required for creating a website.

Or

(b) Discuss the role of PHP in dynamic website development.

12. (a) Explain the use of conditional statements in PHP with examples.

Or

(b) How do you embed HTML in PHP? Explain.

13. (a) Explain the use of the for () loop in PHP with an example. Write the typical use cases.

Or

(b) How are array functions used in PHP to manipulate data?

14. (a) Describe the process of reading and writing files in PHP.

Or

(b) Explain: How is file data read and processed in a PHP application?

15. (a) Explain the use of session variables in PH? And their importance.

Or

(b) Discuss the process of setting and retrieving cookies in PHP.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Compare and contrast the installation and features of XAMPP and WAMP for PHP development.

17. Explain with examples: Conditional statements in PHP programming.

18. Discuss the role of arrays and PHP functions in organizing and processing data in a web application.

19. Explain the file handling techniques in PHP and how they can be used to manage data effectively in web applications.

20. Discuss the techniques for managing sessions and cookies in PHP, focusing on their role in maintaining state in web applications.

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23BCA4S2

B.C.A. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Computer Applications

CYBER FORENSICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What are the key objectives of computer forensics?

2. How is computer forensics used in law enforcement?

3. Define data recovery in the context of computer forensics.

4. What is volatile evidence?

5. What is the purpose of duplicating digital evidence?

6. Define evidential authentication in computer forensics.

7. How is "time travel" used in forensic analysis?

8. What is the importance of identifying technical surveillance devices?

9. How do you convert unusable files in digital investigations?

10. What is network forensics?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Explain the role of computer forensics in human resources/employment proceedings.

Or

(b) How does computer forensics assist in legal proceedings?

12. (a) Explain the general procedure for collecting and archiving digital evidence.

Or

(b) Discuss the different types of evidence collected in computer forensics.

13. (a) Explain the special needs of evidential authentication in digital forensics.

Or

(b) How does the legal framework impact the collection and preservation of digital evidence?

14. (a) How does forensic identification aid in analyzing technical surveillance devices?

Or

(b) Describe the role of time travel in digital forensic investigations.

15. (a) Discuss the technical approach to network forensics in an investigation scenario.

Or

(b) How can the destruction of emails impact digital evidence?

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Compare the types of computer forensic technologies used in business, military, and law enforcement contexts.

17. Explain the process of data recovery and its significance in computer forensics, including the role of backups.

18. Discuss the methods and significance of computer image verification and authentication in ensuring the integrity of digital evidence.

19. Analyze the significance of electronic document discovery in legal cases, including the methods and challenges involved.

20. Discuss the challenges and techniques involved in documenting data destruction and intrusion in digital forensic investigations.

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