S–0296

Sub. Code
23BCE1C1

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Computer Science

PROGRAMMING IN C

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define Token.
2. How to declare Variable in C?
3. Illustrate : operator.
4. Define Jump statement
5. Compare One dimensional and Two dimensional array.
6. How to initialize String Variables?
7. Define Recursion
8. Write a note on Union.
9. List out I/O file operations.
10. How to access variable through pointer?

Part B (5 × 5 = 25)

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

11. (a) Illustrate the structure of C program with neat sketch.

Or

(b) Discuss various Data types in C with example.

12. (a) Differentiate Formatted Input and Output Statement.

Or

(b) Demonstrate goto statement with example.

13. (a) Write a note on Multi-Dimensional array with example.

Or

(b) Discuss any five String handling functions with example.

14. (a) Compare Array of Structures and Array within Structures.

Or

(b) Write a detailed note on Bit Fields.

15. (a) Describe Pointer increment and Scale factor.

Or

(b) Explain Command Line Arguments with example.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Illustrate various types of Operators with suitable example.

17. Explain Nested if-else statement with example in C.

18. Write a C program to multiply matrix elements using two dimensional array.

19. Discuss in detail about nested function with example.

20. How to handle errors during I/O operations? Explain with example.

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S–0297

Sub. Code
23BCEA1

U.G. DEGREE EXAMINATION, NOVEMBER 2025

Computer Science

Allied – DIGITAL LOGIC FUNDAMENTALS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

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

Answer **all** questions.

1. What is meant by binary numbers?

2. Convert the decimal value of 52 into binary equivalent.

3. Illustrate SOP.

4. What is the Binary addition value of $1111_2 + 101010_2$?

5. Illustrate about Encoder.

6. What is Parity Checker?

7. Define flip flop.

8. Compare JK and D Flip Flop

9. Define Ripple Counter.

10. Demonstrate RAM.

Part B (5 × 5 = 25)

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

11. (a) Write a note on Truth Table with example.

Or

(b) Convert binary value into decimal value.

(i) 111111100_2

(ii) 101010101_2.

12. (a) How to represent Binary number? Explain with example.

Or

(b) Describe the concept Adder and Subtractor.

13. (a) Write a note on Multiplexer with diagram.

Or

(b) Describe Parity Generator in detail.

14. (a) Write a short note on RS flip flop.

Or

(b) Describe the types of shift Register.

15. (a) Write a note on Asynchronous counter.

Or

(b) Describe the types of ROMs.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss about Logic Gates with examples.

17. Explain about Boolean Algebra with examples.

18. Illustrate Code Converter in detail.

19. Explain about Master Slave Flip Flop in detail.

20. Describe types of RAM with examples.

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S–0298

Sub. Code
23BCE1S1

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Computer Science

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 computer?

2. Name any two key characteristics of a computer.

3. What is the role of I/O devices in a computer?

4. Compare Printer and Plotter.

5. Differentiate between the primary and secondary storage devices.

6. Define common data storage and retrieval methods.

7. Name two types of application software.

8. Define Software.

9. What is batch processing?

10. What is the role of a compiler?

Part B (5 × 5 = 25)

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

11. (a) Write a brief note on the characteristics of computers.

Or

(b) Discuss in brief about the classification of computers.

12. (a) Mention the importance of output devices in a computer system.

Or

(b) List out the terminals and its types used as input devices.

13. (a) Explain in brief about secondary storage devices.

Or

(b) Differentiate between RAM and ROM.

14. (a) Differentiate between system software and application software.

Or

(b) Explain in brief about the software and its need with a neat structure.

15. (a) Discuss in brief about the key factors that influence system performance.

Or

(b) Write a brief note on assemblers with a neat structure.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain in detail about the evolution of computers.

17. Discuss in detail about input devices with a neat structure.

18. Describe in detail about the characteristics, advantages, and disadvantages of Magnetic tapes with a neat structure.

19. Discuss the following, (a) Machine language, (b) Assembly language, (c) High level language.

20. Explain in detail the following, (a) Batch processing, (b) Multiprogramming, (c) Multiprocessing.

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S–0299

Sub. Code
23BCE1FC

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Computer Science

PROBLEM SOLVING TECHNIQUES

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Compare 4 GL and 5GL.
2. Define Memory.
3. Explain Pseudocode.
4. Discuss the advantages and disadvantages of Algorithm.
5. Differentiate Relational and Logical Operators.
6. Discuss application of Selection structure.
7. Describe Character Data.
8. How to declare Array?
9. Define Subprogram.
10. Write the procedure to create a file.

Part B (5 × 5 = 25)

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

11. (a) Discuss the characteristics and limitations of Computer.

Or

(b) Describe the features of good programming language.

12. (a) Illustrate types of flowchart in detail.

Or

(b) Write a note on Modular Programming.

13. (a) Explain Counter Controlled Loop.

Or

(b) Discuss application of Repetition structure.

14. (a) Compare One Dimensional and Two Dimensional Array.

Or

(b) Describe Numeric data in detail.

15. (a) Write a note on functions.

Or

(b) Describe Recursion in detail.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Describe in detail about various types of Computers based on Size.

17. Elucidate the phases of PDC in detail.

18. Explain Nested Loops in detail with example.

19. Describe Array of Characters in detail.

20. Illustrate different types of DFD with example.

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S–0300

Sub. Code
23BCE2C1

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Second Semester

Computer Science

OBJECT ORIENTED PROGRAMMING CONCEPTS USING C++

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define Encapsulation.

2. What are the built in function for classes?

3. How to declare Object?

4. Illustrate friend function.

5. What is type Conversion?

6. Demonstrate Hybrid inheritance.

7. Define Array.

8. Write a note on dynamic object.

9. Define Template.

10. What is String objects?

Part B (5 × 5 = 25)

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

11. (a) Describe the benefits of OOPs.

Or

(b) Illustrate if else statement in detail.

12. (a) How to define member function in C++? Explain.

Or

(b) Compare Constructor and Destructor.

13. (a) How to overload Binary Operators in C++? Explain.

Or

(b) Demonstrate Abstract classes with example.

14. (a) Compare new and delete operators in C++.

Or

(b) Demonstrate Pointers to derived class in detail.

15. (a) Describe File stream classes in detail.

Or

(b) How to initialize string objects? Explain.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain in detail about Control statement in C++ with example.

17. Discuss array of objects in detail with example.

18. Illustrate Multiple inheritance with suitable example.

19. Explain in detail about virtual function with suitable example.

20. Elucidate Sequential File operations in C++ with example.

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S–0301

Sub. Code
23BCEA2

U.G. DEGREE EXAMINATION, NOVEMBER 2025

Computer Science

Allied – RESOURCE MANAGEMENT TECHNIQUES

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is Operations Research?

2. List the phases of Operations Research.

3. Define Transportation Problem.

4. What are the steps involved in MODI method?

5. Illustrate Transhipment Problem.

6. Define Maximization in an assignment problem.

7. List the types of sequencing problems.

8. What is Total Elapsed Time?

9. Illustrate about CPM.

10. Define Fulkerson's rule.

Part B (5 × 5 = 25)

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

11. (a) Elaborate the scientific methods in operations research.

Or

(b) A factory manufacturers two products A and B. To manufacture one unit of A, 1.5 machine hours and 2.5 labour hours are required. To manufacture one unit of B, 2.5 machine hours and 1.5 labour hours are required. In a month, 300 machine hours and 240 labour hours are available. The profit per unit is Rs.50 for product A and Rs.40 for product B. Formulate as a linear programming problem(LPP).

12. (a) Determine the optimum solution to the following transportation problem using north west corner rule.

	W1	W2	W3	Ai
F1	2	7	4	5
F2	3	3	1	8
F3	5	4	7	7
F4	1	6	2	14
bj	2	6	18	

Or

(b) Discuss the procedure for Matrix Minima Method.

13. (a) Solve the following assignment problem.

	J1	J2	J3	J4
M1	4	2	5	7
M2	8	3	10	8
M3	12	5	4	5
M4	6	3	7	14

Or

(b) Compare and contrast balanced and unbalanced assignment problem.

14. (a) Write the Procedure for solving problems with n Jobs and k Machines.

Or

(b) Enumerate the process of n jobs through two machines.

15. (a) Highlight the steps involved in project scheduling using PERT.

Or

(b) Explain the basic scheduling notations used in CPM.

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

Answer any **three** questions.

16. Describe the scope of operations research.

17. Solve the following Transportation problem and find the initial basic feasible solution using Vogel's approximation method.

	D1	D2	D3	Supply
O1	9	8	5	25
O2	6	8	4	35
O3	7	6	9	40
Demand	30	25	45	

18. Elaborate the procedure of Hungarian Method.

19. There are five jobs (namely 1, 2, 3, 4, and 5), each of which must be processed through machines A, B, and C in the order A-B-C. The processing times (in hours) are given below.

Jobs	1	2	3	4	5
Machine A	5	7	6	9	5
Machine B	2	1	4	5	3
Machine C	3	7	5	6	7

Find the sequence that minimizes the total elapsed time required to complete the jobs.

20. Define PERT and explain the rules for constructing a network diagram.

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S–0302

Sub. Code
23BCEA3

U.G. DEGREE EXAMINATION, NOVEMBER 2025

Computer Science

Allied – MARKUP AND SCRIPTING LANGUAGES

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. State the purpose of the '<meta>' tag in an HTML document.

2. Compare ' ' and '' tags in HTML.

3. Describe the '<audio>' and '<video>' tags in HTML.

4. How can you specify alternate text for an image in HTML, and why is it important?

5. Difference between inline, inline-block, and block elements in CSS.

6. How do you embed CSS within an HTML document?

7. What is the primary role of client-side JavaScript in web development?

8. How do you define a user-defined function in JavaScript? Provide the syntax.

9. What is an event handler in JavaScript?

10. List the advantages of using AJAX in web development.

Part B (5 × 5 = 25)

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

11. (a) HTML5 introduced several new tags that improve the semantic structure of web pages. Discuss these new tags, such as '<section>', '<article>', '<nav>', and '<aside>', and explain how they enhance both the development process and user experience.

Or

(b) Explain the concept of nested tags in HTML. Provide examples where nesting is essential, such as creating lists ('<ul>', '<ol>', '<li>') or complex table structures ('<table>', '<tr>', '<td>').

12. (a) Provide a detailed explanation of how to create and structure an HTML form for user registration, including input fields for name, email, password, and date of birth. Explain how to include labels, placeholders, and form validation attributes.

Or

(b) Describe how to create an image map in HTML. What are the roles of the '<map>' and '<area>' tags, and how can they be used to make an image interactive?

13. (a) Describe the purpose and usage of media queries in CSS, including an example of a media query targeting mobile devices.

Or

(b) Describe the difference between inline, internal, and external CSS. Provide an example of each.

14. (a) How can you manipulate arrays in JavaScript? Discuss methods like 'push', 'pop', 'shift', and 'unshift' with examples.

Or

(b) Regular expressions are powerful tools in JavaScript for pattern matching. Discuss the syntax and usage of regular expressions in JavaScript. Explain how they can be used for tasks such as form validation, text parsing, and search-and-replace operations. Provide examples demonstrating their use.

15. (a) Discuss how the 'Anchor' and 'Link' objects can be used to create dynamic and interactive navigation systems in a web application. Provide examples to illustrate how these objects are manipulated via JavaScript.

Or

(b) Discuss the purpose of AJAX in modern web development. How does it enable the creation of interactive and real-time applications? Provide a case study of an AJAX-based web application that exemplifies its benefits.

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

Answer any **three** questions.

16. Create an HTML document for a blog page with sections such as Header, Navigation Menu, Article Content, Sidebar, and Footer. Write the necessary CSS to style these sections with different background colors, font styles, and a responsive design. The design should include a media query to adjust the layout for mobile devices.

17. Discuss the methods available in HTML for embedding multimedia content such as audio, video, and interactive animations. Provide examples of how to embed each type of content, and explain how to ensure compatibility across different browsers and devices.

18. Suppose you are creating a website for a small bakery, and you want to design a web page for showcasing a special offer on cupcakes. The page will include a header, a section for the special offer, and a footer. Using the CSS box model, you aim to emphasize the special offer section with appropriate spacing and styling. Your goal is to make the offer visually appealing and easy to notice.

19. Create a JavaScript program for a bookstore. The program should allow users to view a list of available books, search for books by title or author, add books to a shopping cart, view their shopping cart with the total cost, and complete their purchase. How would you design and implement this bookstore application using JavaScript?

20. Design a web application that needs to update specific sections of the user interface based on server responses without reloading the entire page. Discuss the method you would use to achieve this and explain how it enhances user experience.

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S–0303

Sub. Code
23BCEA4

U.G. DEGREE EXAMINATION, NOVEMBER 2025

Computer Science

Allied – OPERATING SYSTEM

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is System Call?

2. Define IPC.

3. Illustrate Paging.

4. Write the features of UNIX.

5. List the issues in Deadlock.

6. Define Shell.

7. Write the features of Linux function.

8. Write the purpose of Cat command.

9. What is the purpose of Kill command?

10. How to pass parameters in Shell programming?

Part B (5 × 5 = 25)

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

11. (a) Describe threads in detail.

Or

(b) Illustrate Scheduling and its types.

12. (a) Compare Physical and Logical address space.

Or

(b) How to implement file system? Explain.

13. (a) Discuss in detail about Deadlock Avoidance.

Or

(b) Compare DOS based and NT based Windows.

14. (a) What are the installing requirements in Linux? Explain.

Or

(b) How to view files in Linux? Explain.

15. (a) Compare grep and fgrep with example.

Or

(b) Describe Mathematical Commands in Linux.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss in detail about different operating Systems in detail.

17. Explain any two page replacement algorithm with example.

18. Illustrate in detail about Android Architecture with neat sketch.

19. Elucidate in detail about essential Linux commands with example.

20. Explain various types of Shell in detail.

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S–0304

Sub. Code
23BCE2S1

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Second Semester

Computer Science

OFFICE AUTOMATION

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Write the steps how to find text in MS-Word.

2. How to change the entire page color with desired color?

3. How do you insert page numbers?

4. What are the different types of tabs?

5. How can one restrict copying a cell from a worksheet?

6. How do you create Named Ranges?

7. What precautions should be taken while using MS Access?

8. What are applications of MS Access?

9. Explain the motion path in PowerPoint.

10. What are the steps to testing an action button?

Part B (5 × 5 = 25)

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

11. (a) Discuss the applications of Word processing in brief.

Or

(b) Write a short note describing the concept of 'Style' in MS-Word.

12. (a) What are the different methods to change margin in writer?

Or

(b) What are the advantages of using Tamil Interface?

13. (a) What is sort? Write steps for sorting procedure.

Or

(b) Differentiate between the terms "absolute cell referencing" and "relative cell referencing" in Microsoft Excel.

14. (a) How will you create a table in MS Access?

Or

(b) What are the uses of 'Forms' in Ms Access?

15. (a) Write the step for creating slides using layouts.

Or

(b) Write steps for line spacing in Power Point presentation.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the References tab from tool bars used in MS-Word.

17. Explain the procedure to insert headers and footers in MS-Word. Also describe the purpose of using headers and footers along with various settings for headers and footers.

18. What is a chart and explain different steps for inserting a chart in Excel?

19. How to Create and Run a Macro in Microsoft Access?

20. What are the different views in Power Point Presentation?

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S–0305

Sub. Code
23BCE2S2

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Second Semester

Computer Science

INTRODUCTION TO HTML

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is Internet?

2. List the features of HTML.

3. What are heading tags in HTML?

4. Illustrate strike tag.

5. Write a note on Nested List.

6. Illustrate the function of Marquee Tag.

7. Define Frames.

8. Compare Rowspan and Colspan.

9. What is HTML form?

10. Write the purpose of <option> tag in HTML.

Part B (5 × 5 = 25)

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

11. (a) Write the features of Web Browser.

Or

(b) Describe basics of HTML in detail.

12. (a) What are block level text elements in HTML?

Or

(b) Describe paragraph tags in HTML with example.

13. (a) Demonstrate ordered list with suitable example.

Or

(b) How to insert image in HTML? Explain.

14. (a) What are the table elements available in HTML? Explain.

Or

(b) Illustrate Frameset in detail.

15. (a) Discuss different types of <input> fields using in HTML forms.

Or

(b) What is <field set> and <legend tag> in HTML? Explain.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the difference between Webpage and Website.

17. Illustrate the structure of HTML with example.

18. Describe the procedure to create unordered lists in HTML.

19. How to use Rowspan and Colspan in table? Explain.

20. Explain Form validation in HTML with example.

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S–0306

Sub. Code
23BCE3C1

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

Computer Science

DATA STRUCTURE AND ALGORITHMS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Write the Basic Terminology of Data Structure.

2. How to declare arrays?

3. What is Linked List?

4. How to represent Circular Linked List?

5. What are the Operations of stack?

6. How to represent Queue?

7. What is Binary Tree?

8. Write the Terminologies of Graph.

9. Compare Linear and Binary Search.

10. What is Shell Sort?

Part B

$(5 \times 5 = 25)$

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

11. (a) Illustrate the Classification of Data structures.

Or

(b) How to access array elements in Data Structures? Explain.

12. (a) Write the Basic Terminologies of Linked Lists.

Or

(b) How to perform insert, delete and select operations on Singly Linked List? Explain.

13. (a) Describe the Operations on Linked Stack.

Or

(b) Illustrate Queue and its Operations with example.

14. (a) Describe Huffman's Tree with example.

Or

(b) How to represent Graph? Explain.

15. (a) Write the working procedure of Linear Search.

Or

(b) How to sort numbers using Selection Sort? Explain.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain in detail about Sparse Matrices with example.

17. Discuss in detail about the basic operation of Doubly Linked List.

18. Explain in detail about Array representation of Stack.

19. How to insert and delete a node in Binary Search Tree? Explain.

20. Describe in detail about Merge Sort with suitable example.

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S–0307

Sub. Code
23BCE3S1

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

Computer Science

WEB DESIGNING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is CSS?

2. Compare XML and DHTML.

3. How to format text in CSS?

4. Write a note on Navigation Bar in CSS.

5. Define DHTML.

6. Write a note on Data Binding.

7. How to declare variable in JavaScript?

8. Illustrate function definition in JavaScript.

9. What are JavaScript Objects?

10. How can JavaScript interact with Web browser environment?

Part B (5 × 5 = 25)

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

11. (a) What are the advantages of using CSS in web design?

Or

(b) Describe the basic structure of XML document.

12. (a) How to create CSS Id and Class? Explain.

Or

(b) Illustrate the procedure to create page layout in CSS.

13. (a) Describe the key components of DHTML.

Or

(b) How to change style dynamically? Explain.

14. (a) Describe the different types of Conditional Statements in JavaScript.

Or

(b) Illustrate the structure of JavaScript with neat sketch.

15. (a) Describe JavaScript's built in objects in detail.

Or

(b) How JavaScript handle forms and validations? Explain.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss different types of CSS with example.

17. Explain the procedure to create table in CSS.

18. How Event Bubbling differ from Event Capturing? Explain

19. Write a JavaScript coding to generate factorial number.

20. Describe different properties and methods of the form object in JavaScript.

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S–0308

Sub. Code
23BCE3S2

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

Computer Science

MULTIMEDIA SYSTEMS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define multimedia.

2. Mention the name of font editing tools in multimedia.

3. List the common file formats used for color images in multimedia systems.

4. What is Dithering?

5. Name the animation techniques.

6. What do you mean by red book audio?

7. What is the primary difference between traditional animation and computer animation?

8. Define codec in digital video.

9. List two key intangible elements required for a successful multimedia project.

10. Name any two input devices for multimedia.

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

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

11. (a) Highlight the key uses of multimedia in various sectors with examples.

Or

(b) Explain how text is utilized in multimedia projects with suitable examples.

12. (a) Elaborate the process of making still images and how it is used in multimedia projects.

Or

(b) Illustrate the role of color palettes in digital design and multimedia projects.

13. (a) Describe Vaughan's Law of Multimedia Minimums and its relevance to audio.

Or

(b) Compare and contrast the use of sound in desktop multimedia systems versus mobile multimedia applications.

14. (a) Describe the process of creating a simple animation, like a rolling ball, using computer software.

Or

(b) Explain the process of storyboarding and its significance in video production.

15. (a) Describe the four primary stages in a multimedia project.

Or

(b) Highlight the features of 3-D Modeling and Animation Tools.

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

Answer any **three** questions.

16. Enumerate the uses of hypermedia and hypertext in multimedia.

17. Analyze the principles of vector drawing.

18. Discuss the process of creating digital audio files and the factors affecting their quality and size.

19. Discuss various animation techniques used in multimedia.

20. Determine the various multimedia authoring tools and explain its functions.

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S–0309

Sub. Code
23BCE4C1

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fourth Semester

Computer Science

JAVA PROGRAMMING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is Java Programming?

2. List out the object oriented concepts.

3. Define method overriding.

4. Write the syntax of exception handling.

5. What is synchronization?

6. Define byte stream.

7. List out the AWT controls.

8. What is adapter class?

9. Draw the hierarchy of swing components.

10. Define JPanel.

Part B (5 × 5 = 25)

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

11. (a) Describe the concept of constructor methods and usages in Java.

Or

(b) Compare and contrast the String and StringBuffer classes in Java.

12. (a) Explain Packages with example.

Or

(b) Demonstrate the concept of method overloading in Java.

13. (a) Discuss the strategies for preventing deadlock in operating systems.

Or

(b) Examine the fundamental concepts of I/O streams.

14. (a) Illustrate how to create and manage GUI applications using the frame class.

Or

(b) Analyze the concept of event delegation model in Java.

15. (a) Identify the top-level containers with suitable examples.

Or

(b) Demonstrate the usage of JCheckBox component in Java.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Illustrate the Java Virtual Machine architecture with neat sketch.

17. Explain Inheritance and its types with appropriate examples.

18. Analyze the features of multithreaded programming with example.

19. Explain how to create and manage AWT controls in Java.

20. Highlight the importance of swing components in Java and explain how they enhance GUI application development with relevant examples.

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S–0310

Sub. Code
23BCE4S1

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fourth Semester

Computer Science

PHP PROGRAMMING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is PHP and why is it used in web development?

2. What is a dynamic website, and how does PHP contribute to its functionality?

3. How do you declare a variable in PHP?

4. What is the purpose of the if statement in PHP?

5. What is the purpose of the switch statement in PHP?

6. How does the for loop differ from the while loop in PHP?

7. What function is used to open a file for reading in PHP?

8. How can you read data from a file using PHP?

9. How do you start a session in PHP?

10. How do you delete a cookie in PHP?

Part B (5 × 5 = 25)

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

11. (a) Discuss the process of installing WAMP and its basic configuration. How do you verify that the installation was successful?

Or

(b) Compare and contrast PHP with other server-side scripting languages like Python and Ruby. Discuss PHP's advantages and limitations in web development.

12. (a) Explain the role of operators in PHP, including arithmetic, comparison, and logical operators. Provide examples of each type of operator in use.

Or

(b) Discuss how to handle form data in PHP. Explain the use of $_GET and $_POST superglobals with examples.

13. (a) Explain how to use the foreach loop to process an array in PHP with an example.

Or

(b) Describe how to create, modify, and process arrays in PHP, including using array functions. Provide code examples.

14. (a) Explain how to read and write data to a file in PHP. Include examples of using fopen (), fread (), fwrite (), and fclose (). Discuss how to handle common file-related errors.

Or

(b) Describe the process of handling file uploads in PHP. Explain how to manage the upload form, handle the file in PHP, and validate file types and sizes. Provide a sample code for handling file uploads.

15. (a) Explain the process of managing sessions in PHP. Describe how to start a session, set and retrieve session variables, and destroy a session. Provide code examples for each step.

Or

(b) Describe how to use cookies in PHP for storing user data. Include steps for setting a cookie, retrieving a cookie value, and deleting a cookie. Provide code examples and discuss the limitations and security considerations of using cookies.

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

Answer any **three** questions.

16. Explain the role of PHP in web development. How does PHP differ from HTML, and what are the steps to set up a PHP development environment using XAMPP or WAMP?

17. Write a PHP script that demonstrates the use of different data types and operators. The script should also include conditional statements to check if a number is positive, negative, or zero, and display the result accordingly.

18. Create a PHP script that uses both for ( ) and while ( ) loops to process an array of integers. The script should compute the sum of the array elements using the for ( ) loop and display the results. Additionally, use the while ( ) loop to count the number of even and odd numbers in the array.

19. Write a PHP script that reads data from a file and displays its contents on a web page. The script should handle scenarios where the file might not exist or could not be read. Provide error handling and messages accordingly.

20. Design a PHP script that demonstrates session management. The script should start a session, store user information in session variables, and include functionality to destroy the session and clear session data. Additionally, illustrate how to set and retrieve cookies to store user preferences.

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S–0311

Sub. Code
23BCE4S2

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fourth Semester

Computer Science

SOFTWARE TESTING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

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

Answer **all** questions.

1. Differentiate between fault and failure.
2. Illustrate how functional testing differs from structural testing.
3. Explain the process of decision table-based testing.
4. What are achievable and non-achievable paths? Elaborate on these.
5. List the role of domain and range in interface testing.
6. Illustrate various domain errors.
7. Define hidden language in syntax testing.
8. Define path product and path expression.
9. Differentiate between impossible state and equivalent state.
10. List any two scenarios in which state testing prove to be more useful.

Part B (5 × 5 = 25)

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

11. (a) Using suitable diagram, explain the testing life cycle model.

Or

(b) Discuss the various consequences of bugs with suitable example. How does each one of them affect us?

12. (a) Discuss the basic principles of testing required for building efficient test cases.

Or

(b) Explain the process of predicate interpretation. Elaborate on the correlation of variables and predicates.

13. (a) Illustrate the limitations of the static analysis method of source code for anomaly detection. How does dynamic analysis help to overcome them?

Or

(b) Write short notes on nice and ugly domains.

14. (a) Write the working procedure of a compiler.

Or

(b) Describe in detail about the cyclomatic complexity rules of thumb.

15. (a) How can we use decision tables to carry out logic-based testing?

Or

(b) Write short notes on :

(i) Boolean algebra

(ii) Boolean equations.

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

Answer any **three** questions.

16. Write a detailed note on various types of structural bugs with suitable program as example. Discuss about possible remedial measures to handle such bugs.

17. Write a detailed note on path testing. Discuss the criteria for path selection and path testing with suitable example.

18. Discuss and compare the effectiveness of the various strategies for domain testing.

19. Explain in detail about the role of Backus Naur Form for syntax testing. Provide complete description of its characters, operators and repetitions using suitable example.

20. Elaborate in detail on the various types of KV charts and how are they used to visualize data?

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S–0312

Sub. Code
23BCE5C1

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fifth Semester

Computer Science

OPERATING SYSTEMS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is Context switching?

2. List out the process states.

3. Define Critical section.

4. What is counting semaphores?

5. Write about Hold and wait condition.

6. What is deadlock detection?

7. Define Preemptive scheduling.

8. Why disk scheduling is necessary?

9. Draw Memory hierarchy.

10. What is memory swapping?

Part B (5 × 5 = 25)

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

11. (a) Describe about Message passing.

Or

(b) Explain about process control block with block diagram.

12. (a) Discuss about semaphores.

Or

(b) Briefly Describe the Monitors.

13. (a) Write the Dijktra's Banker's algorithm.

Or

(b) Discuss about the Resource concepts.

14. (a) Describe about types of processor scheduling levels.

Or

(b) What is Multilevel feedback queues? Explain.

15. (a) Differentiate Contiguous and Non Contiguous memory allocation.

Or

(b) Describe about Paging with example.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Draw neatly Life cycle of a process and explain.

17. Explain in detail about Mutual Exclusion problem.

18. What is deadlock? And explain the four necessary conditions of deadlock.

19. What is disk scheduling? And discuss about any three scheduling algorithms with suitable example.

20. Explain about Memory Organization in detail.

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S–0313

Sub. Code
23BCE5C2

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fifth Semester

Computer Science

DATABASE MANAGEMENT SYSTEM

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Differentiate between Data and Information.

2. What are Business Rules in database design?

3. What are Integrity Rules in the Relational Model?

4. Define Entity Relationship Model.

5. What is need of Normalization?

6. Illustrate Data definition.

7. What is the difference between UNION and UNION ALL operators?

8. Write the purpose of HAVING clause in SQL.

9. What is a Cursor in PL/SQL?

10. List any two types of Exceptions in PL/SQL.

Part B

$(5 \times 5 = 25)$

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

11. (a) Explain the Problems with File System.

Or

(b) Discuss the Degrees of Data Abstraction with examples.

12. (a) Explain Relational Set Operators with examples.

Or

(b) Write short notes on Indexes and Codd's Rules.

13. (a) Explain the Need for Normalization.

Or

(b) Differentiate between Data Manipulation Commands and Data Definition Commands in SQL.

14. (a) Explain Cross Join and Natural Join with examples.

Or

(b) Write short notes on SQL Functions: Date and Time Function, String Function.

15. (a) Write short notes on Control Structures in PL/SQL.

Or

(b) Explain Implicit and Explicit Cursors with examples.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Describe the Evolution of Data Models. Explain with suitable examples.

17. Draw and explain an ER Diagram for a student database management system.

18. Discuss Higher Level Normal Forms with suitable examples.

19. Explain Sub Queries and Correlated Queries with suitable examples.

20. Discuss the Structure of PL/SQL with suitable examples.

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S–0314

Sub. Code
23BCE5C3

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fifth Semester

Computer Science

SOFTWARE ENGINEERING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. State one reason why the classical waterfall model is considered rigid.

2. What is the main advantage of the evolutionary model over the prototyping model?

3. Differentiate between object-oriented design and function-oriented design.

4. List two key activities involved in requirements gathering and analysis.

5. Mention any two characteristics of a good user interface.

6. What is component-based GUI development?

7. Expand the term SECMM and state its purpose.

8. Mention the key difference between black-box testing and white-box testing.

9. Define CASE and mention its objectives.

10. What is meant by software reverse engineering?

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

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

11. (a) Discuss the emergence of software engineering as a discipline in the 1960s.

Or

(b) Describe notable changes in software development practices.

12. (a) Describe the role of neat arrangement in improving the quality of a software design.

Or

(b) Compare top-down and bottom-up software design approaches with examples.

13. (a) List and explain any five characteristics of a good interface.

Or

(b) Draw and explain a simple Data Flow Diagram (DFD).

14. (a) Discuss the key features of a software quality management system.

Or

(b) Write short notes on the Personal Software Process (PSP).

15. (a) List out the characteristics of software maintenance.

Or

(b) In what ways does CASE support the software life cycle model?

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

Answer any **three** questions.

16. Illustrate the different software life cycle models and highlight their differences.

17. Classify the types of cohesion and coupling and their impact on software quality.

18. Explain the steps involved in the Structured Analysis / Structured Design methodology.

19. Discuss the concepts of unit testing, integration testing, and system testing.

20. Evaluate the various software cost estimation techniques and explain their significance.

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S–0315

Sub. Code
23BCE5E1

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fifth Semester

Computer Science

Elective — ARTIFICIAL INTELLIGENCE

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define Artificial Intelligence.

2. Describe the concept of a state space.

3. What is the primary difference between a closed list and an open list in search algorithms?

4. Explain the concept of a "heuristic function" and its purpose in a search algorithm.

5. Define a Hidden Markov Model (HMM).

6. Explain the concept of a temporal model in probabilistic reasoning.

7. List out the four main components of a Markov Decision Process.

8. What is utility theory?

9. What is the primary difference between passive and active reinforcement learning?

10. Define Q-learning.

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

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

11. (a) Describe in detail about agent environments.

Or

(b) Discuss about search graph and search tree.

12. (a) Explain briefly about breadth first search with suitable example.

Or

(b) Describe in detail about the best first search with an example.

13. (a) Discuss the role of Bayes' Theorem in probabilistic reasoning. Provide a simple example to illustrate its application.

Or

(b) Differentiate between joint probability and conditional probability with a clear example.

14. (a) Discuss about the value iteration and policy iteration.

Or

(b) Differentiate between a single-agent search problem and an MDP.

15. (a) Explain about the passive reinforcement learning in detail.

Or

(b) Discuss about the adaptive dynamic programming.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Briefly explain the problem formulation and evaluate the importance of problem formulation in AI.

17. Critically evaluate the A* search algorithm. Discuss its advantages, its limitations and under what conditions it guarantees finding the optimal solution.

18. Compare and contrast the representation and inference process of a Bayesian Network and a Hidden Markov Model (HMM).

19. Evaluate the effectiveness of different MDP solution methods. Discuss the pros and cons of each method.

20. Explain briefly about temporal difference learning and active reinforcement learning.

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S–0317

Sub. Code
23BCE5E3

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fifth Semester

Computer Science

Elective — INTRODUCTION TO DATA SCIENCE

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

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

Answer **all** questions.

1. List two benefits of using Data Science.
2. Write two components of the Big Data ecosystem.
3. Define data transformation.
4. What is Exploratory Data Analysis (EDA)?
5. Give one example of unsupervised learning.
6. What is semi-supervised learning?
7. What is Map Reduce'?
8. Write two differences between SQL and NoSQL.
9. Define data preparation.
10. Mention one tool used in disease prediction studies.

Part B (5 × 5 = 25)

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

11. (a) Explain the importance of Big Data in real-world applications.

Or

(b) Illustrate the key stages in the data science process with a diagram.

12. (a) Explain the process of retrieving data in Data Science.

Or

(b) Summarize the key stages of model building.

13. (a) Illustrate any one supervised learning algorithm with an example.

Or

(b) Distinguish between classification and regression problems.

14. (a) Explain the architecture of Hadoop framework.

Or

(b) Differentiate between ACID and BASE properties in databases.

15. (a) Explain the steps involved in disease prediction using Data Science.

Or

(b) Differentiate between disease profiling and disease presentation.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Analyse the Big data ecosystem and explain how it supports the Data Science process.

17. Critically evaluate the importance of exploratory data analysis in data science.

18. Describe in detail the different types of machine learning algorithms with suitable example.

19. Discuss the components of Hadoop ecosystem in detail with suitable diagrams.

20. Design a data science case study for predicting disease spread, covering preparation, exploration, profiling, and presentation.

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S–0318

Sub. Code
23BCE5E4

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fifth Semester

Computer Science

Elective — BIG DATA ANALYTICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define the term Big Data in the context of modern data analytics.

2. Compare HDFS and traditional file systems.

3. Name two diagnostics used to evaluate clustering quality.

4. What is the purpose of evaluating a decision tree?

5. Discuss the benefits of hybrid recommendation approaches.

6. What is the Apriori algorithm used for?

7. How are streams filtered in real-time analytics?

8. Outline the concept of a decaying window in stream processing.

9. Define NoSQL databases and their schema-less models.

10. List the characteristics of graph databases.

Part B (5 × 5 = 25)

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

11. (a) Define the evolution of Big Data over the years.

Or

(b) Illustrate MapReduce model with a simple data processing example.

12. (a) Describe the working of the K-means clustering algorithm.

Or

(b) Evaluate the accuracy of a decision tree classification model.

13. (a) Describe the working process of the Apriori algorithm.

Or

(b) Justify the use of knowledge-based recommendation in niche markets.

14. (a) Explain sampling techniques used in stream data processing.

Or

(b) Compare graph analytics with traditional analytics for big data.

15. (a) Differentiate document stores and tabular stores in NoSQL.

Or

(b) Evaluate the use of Twitter data in big data analytics.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Evaluate HDFS in terms of scalability, fault tolerance, and storage efficiency.

17. Justify the use of Naïve Bayes classifier for text classification problems.

18. Summarize the key steps involved in collaborative recommendation systems.

19. Describe the architecture of a stream data model with key components.

20. Discuss big data applications in e-commerce and blogging platforms.

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