C–5951

Sub. Code
80513

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

IT and Logistics

PROGRAMMING IN C

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions

1. In C, the set of characters that includes letters, digits, and special symbols is known as the
   (a) Character group
   (b) Alphabet list
   (c) Fundamental character set
   (d) ASCII block
2. The size of a char in C is _____ bytes.
   (a) 2 (b) 4
   (c) 1 (d) 8
3. The control structure that is used to make decisions is called
   (a) For Loop (b) While Loop
   (c) If Statement (d) Scanf
4. The header file needed for printf() and scanf() is _____
   (a) math.h (b) stdio.h
   (c) conio.h (d) string.h

5. The return type of a function is specified in the function _____

(a) call (b) body

(c) definition (d) prototype

6. The use of register keyword is just a _____ to the compiler.

(a) mandatory order

(b) request

(c) warning

(d) function call

7. A single-dimensional array is also known as a _____ array.

(a) row (b) linear

(c) matrix (d) column

8. To copy one string to another, we use

(a) copy str()

(b) strcopy()

(c) strcpy()

(d) strcat()

9. A structure in C is a collection of _____ data types.

(a) similar (b) different

(c) constant (d) static

10. Pointers provide efficient way of handling _____ structures.

(a) large (b) small

(c) static (d) duplicate

Part B (5 × 5 = 25)

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

11. (a) Explain the concept of variable declaration and initialization in C. Provide examples for both.

Or

(b) Explain the use of logical operators in C. Provide truth table-based examples for &&, ||, and !.

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

Or

(b) Explain goto statement with pros and cons.

13. (a) Difference between function with and without arguments.

Or

(b) List and describe all C storage classes briefly.

14. (a) Explain the difference between an array and a normal variable in C.

Or

(b) List any three standard string functions in C and explain their use.

15. (a) How is a structure declared and initialized in C? Provide syntax and a code snippet.

Or

(b) List and explain the different file opening modes available in C.

Part C

(5 × 8 = 40)

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

16. (a) Write a C program demonstrating use of int, float, char, and double.

Or

(b) Define identifiers and keywords. State the rules for naming identifiers and provide examples.

17. (a) Compare for, while, and do-while with programs.

Or

(b) Explain scanf() and printf() with syntax, format specifiers and examples.

18. (a) Describe scope, lifetime, and default values of storage classes.

Or

(b) What are automatic variables? Explain with examples.

19. (a) Explain different ways to declare, initialize, and access elements of a single-dimensional array in C with a program.

Or

(b) Compare single-dimensional and multi-dimensional arrays with syntax and example.

20. (a) Explain the differences between structure and union in detail with memory layout and code examples.

Or

(b) Explain call-by-reference using pointers with a program.

C–5952	Sub. Code 80515

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025.

First Semester

IT and Logistics

MATHEMATICS – I

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. The expansion of $\cos 2\theta$ is

(a) $2\cos\theta\sin\theta$ (b) $\cos^2\theta - \sin^2\theta$

(c) $\cos^2\theta + \sin^2\theta$ (d) $\cos\theta\sin\theta$

2. The expansion of $\sin^3\theta$ is

(a) $\frac{1}{2}(3\sin\theta - \sin 3\theta)$

(b) $\frac{1}{3}(3\sin\theta - \sin 3\theta)$

(c) $\frac{1}{4}(3\sin\theta - \sin 3\theta)$

(d) $\frac{1}{5}(3\sin\theta + \sin 3\theta)$

3. For any sets A and B, $A-(A\cap B)$ is equal to

(a) $A-B$ (b) $B-A$

(c) $(A\cup B)$ (d) $A\cap B$

4. Which of the following is an one-to-one function?

(a) $f(x)=x^2$

(b) $f(x)=x^3-x$

(c) $f(x)=\sin x$

(d) $f(x)=x+1$

5. The equation $|A-\lambda I|=0$ is called _____ equation of A.

(a) Characteristic (b) Linear

(c) Non-linear (d) Trivial

6. If A is a singular matrix, then atleast one of the eigenvalues of A is

(a) Zero (b) Non-zero

(c) Complex (d) Real

7. α is said to be root of the equation $f(x)=0$ if $f(\alpha)$ is equal to

(a) 1 (b) 0

(c) non-zero (d) ∞

8. For the equation $x^6+3x^5+5x^4+5x^2+3x+1=0$, which is a reciprocal equation, how many distinct roots does it have?

(a) 1 (b) 2

(c) 3 (d) 6

9. If m is a positive integer less than n, then $D^n\left(ax+b\right)^m$ is

(a) 0 (b) 1

(c) a (d) $m(ax+b)^{m-n}$

10. If $v=\frac{xz}{x^2+y^2}$, then $\frac{\partial^2 v}{\partial x^2}+\frac{\partial^2 v}{\partial y^2}+\frac{\partial^2 v}{\partial z^2}$ is

(a) $\frac{1}{2}\left(\frac{xz}{x^2+y^2}\right)^2$

(b) 1

(c) 0

(d) Undermined

Part B (5 × 5 = 25)

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

11. (a) Expand $\cos 8\theta$ in a series of powers of $\sin\theta$.

Or

(b) Evaluate $\lim_{x\to 0}\left[\frac{\tan 2x-2\sin x}{x^3}\right]$.

12. (a) Prove De Morgan's laws for sets.

Or

(b) Let R be a relation on a set A. Prove that if R is reflexive and transitive, then $R^2=R$.

13. (a) Prove that the eigenvalues of a real symmetric matrix are real.

Or

(b) Find the eigenvalues and egienvectors of the matrix $A = \begin{pmatrix} 2 & -2 & 2 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{pmatrix}$.

14. (a) If α, β, γ are the roots of the equation $x^3 - px^2 + q^x - r = 0$, form the equation whose roots are $B + \gamma - 2\alpha,\ \gamma + \alpha - 2\beta,\ \alpha + \beta - 2\gamma$.

Or

(b) Find the negative root of the equation $x^3 - x^2 + x + 100 = 0$, correct to three decimal places, by Newton's method.

15. (a) Prove that $D^n y = a^n \cos\left(n\frac{\pi}{2} + ax + b\right)$, when $y = \cos(ax + b)$.

Or

(b) Examine $f(x, y) = x^3 y^2 (12 - x - y)$ for extreme values.

Part C (5 × 8 = 40)

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

16. (a) If $x = 2\cos\theta$, prove that $\frac{1 + \cos 7\theta}{1 + \cos\theta} = \left(x^3 - x^2 - 2x + 1\right)^2$.

Or

(b) Expand $\sin^3\theta + \cos^5\theta$ in a series of sines of multiples.

17. (a) Prove that the distributive law holds for the intersection over the union of sets : $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.

Or

(b) Prove that if a relation R on a set A is symmetric and transitive, then R is reflexive iff for every $a \in A$, $\exists\, b \in A$ such that aRb.

18. (a) Find the eigenvalues and eigenvectors of the matrix $A = \begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{pmatrix}$.

Or

(b) Verify Cayley-Hamilton theorem for $\begin{pmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{pmatrix}$ and find its inverse.

19. (a) Find the positive root of the equation $x^x = 1000$, correct to 3 places of decimals, using Newton's method.

Or

(b) Solve $x^4 - 8x^3 + 34x^2 - 72x + 45 = 0$, given that $2 + i\sqrt{\pi}$ is a root.

20. (a) Discuss the maxima and minima of the function $f(x,y) = x^4 + y^4 - 2x^2 + 4xy - 2y^2$.

Or

(b) If $u = \sin^{-1}\left(\frac{x^2 + y^2}{x + y}\right)$, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \tan u$,

(i) by using Euler's theorem.

(ii) without Euler's theorem.

C–5953	Sub. Code 80516

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

IT and Logistics

PROBLEM SOLVING TECHNIQUES

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. The Keyword 'break' cannot be simply used within:

   (a) Do-While (b) if- else

   (c) for (d) while

2. The Operator/can be applied to

   (a) Integer values (b) Float values

   (c) Double values (d) All of these

3. In a structure, what are the members also known as?

   (a) Variables (b) Properties

   (c) Objects (d) Elements

4. Which keyword is used to declare a union in C?

   (a) Struct (b) Union

   (c) Class (d) Type def

5. In C, What is a pointer primarily used for?

(a) Decision making

(b) Code organization

(c) Variable Declaration

(d) Storing values

6. Which of the following is the correct syntax to send an array as a parameter to function?

(a) Func (&array); (b) func(#array);

(c) func (*array); (d) func(array[size]);

7. Linear search is also called

(a) Random Search (b) Sequential Search

(c) Perfect Search (d) None

8. What is the base case (stopping condition) for the recursive factorial function?

(a) N==0 (b) n==1

(c) n < 0 (d) n > 10

9. How many prime numbers are there between 1 and 10?

(a) 3 (b) 4

(c) 5 (d) 6

10. What will be the resulting array after reversing arr [] = {3,5,4,2}?

(a) 2,3,5,4 (b) 4,2,3,5

(c) 5,4,2,3 (d) 2,4,5,3

Part B (5 × 5 = 25)

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

11. (a) Explain about the Nation of Algorithm and programs.

Or

(b) Discuss about the Data Type and Operators.

12. (a) Detail about the types of Structure with explanation.

Or

(b) Difference between Union and Structure.

13. (a) Explain about the Pointer in C and Types.

Or

(b) Discuss about the String representation using Pointers.

14. (a) Details about the Exchanging the values of two variables and counting.

Or

(b) Explain about the linear search algorithm.

15. (a) Discuss about the Generating prime numbers.

Or

(b) Detail about the Removal of duplicates from an ordered array.

Part C

(5 × 8 = 40)

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

16. (a) Explain about the Control Statements with an Example.

Or

(b) Discuss about the Prototype and Function.

17. (a) Details about the Array of structure and Array as structure element.

Or

(b) Explain about the String zing operator with an Example.

18. (a) Discuss about the Dynamic memory allocation.

Or

(b) Detail about the file handling with an Example.

19. (a) Explain about the Sine function computation.

Or

(b) Discuss about the Factorial Computation.

20. (a) Detail about the Generating prime factors of an integer with an example.

Or

(b) Discuss about the nth Fibonacci numbers with an Examples.

C–5958

Sub. Code
80533

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

IT and Logistics

FUNDAMENTALS OF LOGISTICS

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. Place utility is created by _____.
   (a) Operation function
   (b) Logistics function
   (c) Procurement function
   (d) Distribution function

2. Service industries like logistics, bonding with the _____ is important.
   (a) Manufacturers (b) Customers
   (c) Landowners (d) Sellers

3. _____ occurs when a company retains another business to perform some of its work activities.
   (a) Outsourcing (b) KPO
   (c) 3PL (d) 4PL

4. The business term that involves choosing a supplier agreeing what to buy at a certain price and by when is called _____.

(a) Logistics (b) Supply chain management

(c) Stock control (d) Procurement

5. _____, production control and physical distribution are the three major operations of logistics

(a) Supply chain management

(b) Material management

(c) Logistics management

(d) All of these

6. Distribution requirements planning is a system for _____.

(a) Inventory management

(b) Distribution planning

(c) Both (a) and (b)

(d) None of the above

7. The first thing that the consumer will notice about the product is the _____of the product.

(a) Price (b) Packaging

(c) Expiry date (d) Bar code

8. _____ is the method of sorting, transporting and distributing products is unitized or standardized form in a container.

(a) Cold chain logistics (b) ICD

(c) Containerization (d) DFC

9. 3PL is a _____ approach with comparing to 4PL.

(a) Broader (b) Wider

(c) Both (a) and (b) (d) Narrow

10. The initial stage of the supply chain process is the _____.

(a) Planning stage (b) Organising stage

(c) Sourcing stage (d) Directing stage

Part B (5 × 5 = 25)

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

11. (a) Explain the functions of logistics.

Or

(b) Describe Customer retention in detail.

12. (a) Discuss the critical issues in logistics outsourcing.

Or

(b) Explain inventory planning models in detail.

13. (a) Explain the scope and objectives of materials management.

Or

(b) What are the Factors influencing Transportation Cost? Explain.

14. (a) Define packaging. Explain the different types of Packaging.

Or

(b) Explain the various functions of packaging.

15. (a) Write a short note on requirements of an effective logistics strategy.

Or

(b) Explain the functions of LIS.

Part C

(5 × 8 = 40)

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

16. (a) Explain the logistics structure required for manufacturing industries in detail.

Or

(b) "Customer satisfaction is the degree to which customer expectations are met" Elucidate.

17. (a) Explain the need and importance of inventory in logistic Industry.

Or

(b) Enumerate the benefits and limitations of outsourcing the procurement function.

18. (a) Explain the objectives and components of material requirement planning.

Or

(b) What are the requirements for efficient transportation system? Explain the benefits of efficient transportation system.

19. (a) Explain elaborately on types of packaging material and packaging cost.

Or

(b) Explain the importance of proper packing of materials and explain the different equipment's in material handling.

20. (a) Explain the barriers to global logistics.

Or

(b) Discuss the role of 3pl and 4pl in logistics.

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C–5959

Sub. Code
80534

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

IT and Logistics

INTRODUCTION TO SHIPPING

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions

1. 1 .Protectionism in sea transport primarily aims to

   (a) Encourage free trade among nations.

   (b) Safeguard domestic shipping industries from foreign competition.

   (c) Promote foreign investment in port infrastructure.

   (d) Eliminate tariffs on maritime freight.

2. The concept of "Flags of Convenience" in ship registration is associated with

   (a) Reducing crew wages through international agreements.

   (b) Registering ships in countries with lenient regulatory standards.

   (c) Ensuring enhanced safety and environmental compliance.

   (d) Enabling vessels to operate across multiple jurisdictions.

3. Load lines on a ship indicate:

(a) The safe loading limits under various water and weather conditions

(b) The maximum speed the ship can achieve

(c) The type of cargo the ship is authorized to carry

(d) The position of the center of gravity of the vessel

4. Which type of ship is primarily designed for the transportation of unpackaged bulk cargo, such as grains or ores?

(a) Tankers (b) Ro-Ro vessel

(c) Container ships (d) Bulk carriers

5. The development of tankers in the early 20th century was primarily driven by

(a) The introduction of diesel-powered engines

(b) The invention of containerization

(c) The growing global demand for oil transportation

(d) Government subsidies for large vessels

6. Freight tariffs in liner shipping are typically influenced by

(a) Market competition and operational costs

(b) The type of goods being transported

(c) Seasonal variations in demand

(d) All of the above.

7. The term "hub port" in maritime trade refers to

(a) A port specializing in regional fishing operations

(b) A central port facilitating the transshipment of cargo to smaller ports.

(c) A port exclusively serving dry bulk carriers

(d) A port with minimal connection to inland transportation networks

8. A Memorandum of Agreement (MOA) in ship sale and purchase transactions is crucial because it

(a) Sets out the initial intent to negotiate a freight rate

(b) Defines the terms of the sale, including price and delivery conditions

(c) Ensures compliance with port state control regulations

(d) Allocates responsibility for chartering between buyer and seller

9. In accounting, the term "capital" refers to

(a) The amount invested in a business by its owners

(b) The total assets of the company

(c) The total revenue generated by a business

(d) The liabilities owed to creditors

10. Protection and Indemnity (P and I) Associations primarily provide cover for

(a) Cargo damage and third-party liability risks

(b) Hull damage caused by collisions

(c) Losses due to fluctuating exchange rates

(d) Legal disputes related to arbitration proceedings

Part B (5 × 5 = 25)

Answer **all** questions, Choosing either (a) or (b)

11. (a) Describe the importance of ships in global trade.

Or

(b) Discuss the different types of shipping markets.

12. (a) Explain the significance of tonnage in ship measurement.

Or

(b) Discuss the different types of tonnage used in shipping.

13. (a) State the significance of liners in global trade.

Or

(b) Discuss the significance of liner shipping for transporting goods.

14. (a) Explain the role of practitioners in the shipping business.

Or

(b) Discuss the responsibilities of shipbrokers in the shipping industry.

15. (a) Explain the basic principles of accounting.

Or

(b) Discuss the importance of accounting in business decision-making.

Part C

(5 × 8 = 40)

Answer **all** questions, Choosing either (a) or (b)

16. (a) Describe the role of port state control in maintaining maritime safety.

Or

(b) Discuss the significance of ship classification for maritime operations.

17. (a) Explain the load line regulations for ship safety.

Or

(b) Discuss the role of market conditions in dry cargo chartering.

18. (a) Discuss the use of chemical tankers and their specific features.

Or

(b) Explain the significance of LNG (Liquefied Natural Gas) tankers in energy transportation.

19. (a) Discuss the role of brokers in ship sale and purchase transactions.

Or

(b) Explain the key steps involved in a Memorandum of Agreement (MOA) for ship sales.

20. (a) Explain the purpose and structure of company accounts.

Or

(b) Explain the basic principles of the law of carriage of goods.

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C–5960

Sub. Code
80535

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

IT and Logistics

DATA STRUCTURES AND ALGORITHMS

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Section A (10 × 1 = 10)

Answer **all** questions.

1. Which of the following is NOT a characteristic of a good algorithm?

   (a) Correctness (b) Ambiguity

   (c) Efficiency (d) Finiteness

2. What does Big-O notation represent in algorithm analysis?

   (a) The worst-case complexity

   (b) The best-case complexity

   (c) The average-case complexity

   (d) The exact execution time

3. What is the time complexity of searching an element in an unsorted array?

   (a) O(l) (b) O(n log n)

   (c) O(log n) (d) O(n)

4. Which principle applies to a queue?

(a) LIFO (Last-In, First-Out)

(b) Random Access

(c) FIFO (First-In, First-Out)

(d) None of the above

5. Out of the following, which one is NOT a tree traversal?

(a) Preorder (b) Inorder

(c) Postorder (d) Level order

6. In a binary tree, the maximum number of children a node can have is:

(a) 1 (b) 2

(c) 3 (d) Unlimited

7. The Divide and Conquer strategy is used to solve which of the following issues?

(a) Knapsack problem

(b) Hashing

(c) Multistage graph

(d) Finding Max-Min

8. Which algorithmic design method is used to solve the Knapsack problem?

(a) Greedy

(b) Divide and Conquer

(c) Dynamic Programming

(d) Backtracking

9. Which sorting algorithm's average-case time complexity is the best?

(a) Bubble Sort (b) Quick Sort

(c) Merge Sort (d) Insertion Sort

10. When sorting the array, which searching algorithm is applied?

(a) Linear search (b) Binary search

(c) Hashing (d) BFS

Section B

$(5 \times 5 = 25)$

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

11. (a) Compare and contrast the step-count method and asymptotic notation in performance analysis.

Or

(b) Explain the step-count method for analyzing algorithm performance.

12. (a) Write an algorithm to delete an element from a specific position in an array.

Or

(b) Explain the distinction between queues and stacks using examples.

13. (a) Write a recursive algorithm for pre-order traversal of a binary tree.

Or

(b) Compare and contrast Depth-First Search (DFS) and Breadth-First Search (BFS).

14. (a) Explain the Greedy method with the Knapsack problem.

Or

(b) Describe the concept of dynamic programming. How does it differ from divide and conquer?

15. (a) Compare and contrast Quick Sort and Merge Sort.

Or

(b) Write an algorithm for Binary Search. Explain its time complexity.

Section C (5 × 8 = 40)

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

16. (a) Describe the data structure classification in depth with example.

Or

(b) Describe the different types of data structures with suitable examples. How do linear and non-linear data structures differ?

17. (a) Explain how a doubly linked list is implemented with insertion and deletion operations.

Or

(b) Explain the representation of a 3D array in memory.

18. (a) Describe the recursive approach to binary tree traversals with examples.

Or

(b) Explain and demonstrate pre-order, in-order, and post-order traversals using recursion.

19. (a) Elaborate the divide and conquer approach with the help of a suitable example.

Or

(b) Discuss the various stages involved in the development of an algorithm using algorithmic design methods.

20. (a) Explain the intricate workings of Bubble Sort, Quick Sort, and Merge Sort.

Or

(b) What is hashing? Explain how hashing works and its applications in data structures like hash tables.

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C–5961	Sub. Code 80536

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

IT and Logistics

PROGRAMMING IN JAVA

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. Java is a _____ programming language.

   (a) Procedural (b) Object-oriented

   (c) Functional (d) Assembly

2. The control structure that repeats a block of code while a condition is true is called a ————————.

   (a) if statement (b) for loop

   (c) while loop (d) switch statement

3. Method overloading means defining multiple methods with the same _____ but different parameters.

   (a) Name (b) Return type

   (c) Variable (d) Class

4. The String class provides a method to find the length of a string called _____.

   (a) size( ) (b) length( )

   (c) getLength( ) (d) count( )

5. Exception handling in Java is done using the _____ keyword.

(a) try (b) catch

(c) finally (d) All of the above

6. The 'sleep ( )' method in Java is used to make a thread ———————— for a specified time.

(a) Pause (b) Stop

(c) End (d) Run

7. The Date class is used to represent ————————.

(a) Files (b) Characters

(c) Dates and times (d) Exceptions

8. File Output Stream is used to write data to a ————————.

(a) Console (b) File

(c) Network (d) Database

9. The Layout Manager that arranges components in a single row or column is called ————————.

(a) GridLayout (b) BorderLayout

(c) FlowLayout (d) CardLayout

10. AWT menus are typically added to a Frame via the ————————.

(a) addMenu( ) (b) setMenu( )

(c) setMenuBar( ) (d) addMenuBar( )

Part B (5 × 5 = 25)

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

11. (a) Explain the concept of object-oriented programming in Java.

Or

(b) Differentiate between unary and binary operators in Java.

12. (a) Describe static methods and how they differ from instance methods.

Or

(b) How is the keyword super used in Java? Provide an example.

13. (a) What are the different access specifiers in Java? Explain their scope.

Or

(b) Explain the life cycle of a thread in Java briefly.

14. (a) Explain the difference between String and StringBuffer in Java.

Or

(b) Describe the use of the Random class with an example.

15. (a) Explain the function of a Layout Manager in AWT.

Or

(b) Differentiate between Menu and MenuItem in AWT.

Part C (5 × 8 = 40)

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

16. (a) Discuss how arrays are managed in Java and the importance of arrays in programming.

Or

(b) Elaborate on various control flow statements in Java and their role in program logic.

17. (a) Elaborate on the String class in Java, focusing on its key methods and immutability.

Or

(b) Describe the types of inner classes in Java and their use cases.

18. (a) Illustrate with examples how multithreading improves the performance of Java programs.

Or

(b) Explain the different access modifiers available in Java and their significance in access protection.

19. (a) Explain the importance of character arrays and demonstrate their use in Java.

Or

(b) Explain file handling in Java using FileInputStream and FileOutputStream with sample code.

20. (a) Describe the process to create and manage nested menus in AWT applications.

Or

(b) Explain how layout managers affect the design of GUI applications and why they are important.

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C–5962

Sub. Code
80538

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025.

Third Semester

IT and Logistics

STATISTICAL AND NUMERICAL METHODS

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. What is the median of the data: 5, 9, 11, 13, 15?
   (a) 9 (b) 11
   (c) 13 (d) 15

2. Which chart is used for time series data?
   (a) Pie chart (b) Line chart
   (c) Bar chart (d) Scatter plot

3. What is the formula for range?
   (a) Mean – Median
   (b) Max – Min
   (c) Mode – Median
   (d) Q3 – Q1

4. A bell-shaped curve represents which distribution?
   (a) Binomial (b) Normal
   (c) Poisson (d) Uniform

5. What is the main purpose of standard deviation?

(a) Measure trend

(b) Measure variability

(c) Measure average

(d) Measure correlation

6. What is the Spearman's rank correlation used for?

(a) Linear data only

(b) Ordinal/non-linear data

(c) Normal distribution

(d) Nominal data

7. In simple random sampling, every unit has:

(a) Equal chance (b) No chance

(c) 50% chance (d) Clustered chance

8. In Simpson's 3/8 Rule, how many intervals are used per segment?

(a) 1 (b) 2

(c) 3 (d) 4

9. Which method is best suited for initial root approximation?

(a) Euler (b) Bisection

(c) RK4 (d) Simpson

10. A Type I error in hypothesis testing means:

(a) Accepting true H_0

(b) Rejecting true H_0

(c) Accepting false H_1

(d) No error

Part B (5 × 5 = 25)

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

11. (a) Define mean, median, and mode.

Or

(b) Write a note on types of graphs in statistics.

12. (a) Explain interquartile range and its usefulness.

Or

(b) Describe five-number summary used in box plots.

13. (a) Compare Pearson's and Spearman's correlation.

Or

(b) Interpret a correlation coefficient of +0.85.

14. (a) Define population and sample with example.

Or

(b) Differentiate between probability and non-probability sampling.

15. (a) Describe the steps in numerical integration using Trapezoidal rule.

Or

(b) Write short notes on errors in numerical differentiation.

Part C (5 × 8 = 40)

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

16. (a) Explain and compare arithmetic, geometric, and harmonic mean.

Or

(b) Solve a grouped data problem involving median and mode.

17. (a) Discuss merits and limitations of different measures of dispersion.

Or

(b) Explain mean absolute deviation and solve with example.

18. (a) What is correlation? Describe its uses in business.

Or

(b) Discuss the importance of regression analysis in forecasting.

19. (a) Explain the theory of numerical integration with derivation of Simpson's rule.

Or

(b) Solve an integration problem using Simpson's 3/8 Rule 20.

20. (a) Apply Runge-Kutta 4th order to solve an ODE with example.

Or

(b) Explain and apply numerical differentiation using central difference.

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C–5967

Sub. Code
80554

B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fifth Semester

IT and Logistics

DATABASE MANAGEMENT SYSTEM

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. What is the main purpose, of a database schema?

   (a) To provide a blueprint of how the database is constructed

   (b) To store data

   (c) To query data

   (d) To delete data

2. Tuple Relational Calculus is:

   (a) A procedural query language

   (b) A non-procedural query language

   (c) A database design tool

   (d) A form of ER diagram

3. Which of the following commands is part of Transaction Control Language (TCL)?

(a) GRANT

(b) CREATE

(c) DELETE

(d) ROLLBACK

4. Which normal form removes partial dependency?

(a) 1NF

(b) 2NF

(c) 3NF

(d) BCNF

5. What is the purpose of reference types in object-relational databases?

(a) To store atomic values

(b) To encrypt data

(c) To create links between objects or tuples

(d) To define table schemas

6. What does complex type querying typically require?

(a) Simple SELECT statements

(b) Specialized functions or operators to access nested data

(c) No SQL commands

(d) Flat file access

7. What is the main purpose of indexing in a database?

(a) To store data

(b) To enforce data integrity

(c) To encrypt data

(d) To speed up data retrieval

8. In query processing, the selection operation is used to:

(a) Combine two tables

(b) Retrieve specific rows from a table based on a condition

(c) Sort rows

(d) Create indexes

9. Which of the following levels in DBMS architecture describes how data is actually stored?

(a) External level

(b) Conceptual level

(c) Internal level

(d) Physical level

10. In which server system architecture does the server process the requests and send only the results back to the client?

(a) File-server

(b) Database-server

(c) Web-server

(d) Application-server

Part B (5 × 5 = 25)

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

11. (a) List the disadvantages of File system over database.

Or

(b) Write short notes on

(i) Views

(ii) UML.

12. (a) What is DML? Explain DML operations with examples.

Or

(b) Analyze about lossless Decomposition.

13. (a) Explain the key features of the object-relational data model.

Or

(b) Discuss how data dictionary storage impacts database performance and integrity.

14. (a) What is serialization? Explain in detail.

Or

(b) List and explain various issues while transactions are running concurrently in DBMS.

15. (a) Differentiate between the three levels of DBMS architecture: internal, conceptual, and external.

Or

(b) Explain two-tier and three-tier client-server architectures in databases.

Part C ($5 \times 8 = 40$)

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

16. (a) Describe the Relational Model in detail with an example.

Or

(b) Draw an E-R diagram for a banking enterprise with almost all components and explain.

17. (a) Illustrate multivalued dependencies and fourth normal form with example.

Or

(b) What is a trigger? How to create it? Discuss various types of triggers.

18. (a) Explain heap and sequential file organization with suitable example.

Or

(b) What are nested relations? Explain with an example how nested relations can be stored and queried.

19. (a) Explain about static and dynamic hashing with an example.

Or

(b) Describe about the Deadlock handling mechanisms.

20. (a) Describe the different types of server system architectures. How do they support database operations in a multi-user environment?

Or

(b) Differentiate between homogeneous and heterogeneous distributed databases.

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