D–1477	Sub. Code
	31511

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

First Semester

DIGITAL COMPUTER ORGANIZATION

(CBCS 2018 / 2020 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Write the names of various number systems.

2. Prove the theorem of Boolean algebra x +1 = 1.

3. Compare Decoders and Encoders.

4. Mention the purpose of Binary counter.

5. What are called computer registers?

6. What do you mean by I/O Interrupt?

7. What are the various addressing modes in an instruction format?

8. What is called I/O interface?

9. What do you mean by IOP?

10. Compare Main memory and Auxiliary memory.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) State and prove De Morgan's theorem.

Or

(b) Explain Sum of products and Product of sums with suitable example.

12. (a) Explain the working of Half adder.

Or

(b) Explain about Error detection codes.

13. (a) Discuss about Timing and control unit.

Or

(b) Write about Memory reference instructions.

14. (a) Illustrate Stack organization.

Or

(b) Explain the various modes of data transfer.

15. (a) Explain the importance of cache memory.

Or

(b) Write short notes on Memory hardware.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Simplify the Boolean expression using K-map:

F = A'C + A'B + AB'C + BC

17. Draw the block diagram of a 4-to- 1-line multiplexer and explain the operation by means of a function table.

18. Describe the design of Basic computer and Accumulator logic.

19. Explain the following:

    (a) Asynchronous Data transfer (b) DMA

20. Describe the memory hierarchy and explain its organization.

D–1478	Sub. Code
	31512

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

First Semester

OBJECT ORIENTED PROGRAMMING AND C++

(CBCS 2018 / 2020 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What is abstraction, and how is it achieved?

2. How do you use the setw manipulator to set the width of the output field?

3. What is constructor?

4. What is the relationship between a class and an instance?

5. What are the types of polymorphism in C++?

6. What is a pure virtual function?

7. How does file input/output differ from console input/output?

8. List out the various operations that can be performed on files.

9. What is the difference between a caught exception and an uncaught exception?

10. State the purpose of rethrow keyword in C++.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Differentiate between procedural and object-oriented programming.

Or

(b) Explain the hierarchy of console stream classes.

12. (a) Explain the need for using a friend function in C++.

Or

(b) Write a C++ program to display the details of five employee using array of objects.

13. (a) Write a C++ program to demonstrate multiple inheritance.

Or

(b) How to convert a class to another class type in C++? Explain with suitable program.

14. (a) Explain with example how can a class template be created.

Or

(b) Discuss on various file stream classes.

15. (a) How do you handle exceptions in operator overloaded functions? Explain.

Or

(b) Write a C++ program to handle multiple exception using multiple catch statements.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss on various unformatted I/O operations with suitable example.

17. Describe the concept of call by reference and return by reference with a programming example.

18. How do you implement operator overloading in C++? Explain with suitable example.

19. Write a C++ program to read the content from one file and write it onto another file.

20. Explain exception handling mechanism with suitable example.

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D–1479	Sub. Code
	31513

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

First Semester

DATA STRUCTURE AND ALGORITHMS

(CBCS 2018/2020 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What are the key characteristics of an algorithm?

2. What is the difference between one-dimensional and two-dimensional array?

3. Convert the following infix expression to postfix expression using Stack $a+b*c+(d+e+f)/g$.

4. Define the term traversal.

5. How do you calculate the depth of a B-Tree?

6. What are the advantages and disadvantages of separate chaining?

7. Name the applications of linear and binary search technique.

8. List the applications of binary tree.

9. Predict the fastest sorting algorithm, Justify.

10. Compare internal and external sorting.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) How do you find complexity of algorithms? Explain.

Or

(b) Discuss on various types of data structure.

12. (a) Write an algorithm for Push and Pop operations on Stack using linked list.

Or

(b) What is circular queue? Write the procedure to insert an element into a circular queue and delete an element from a circular queue using array implementation.

13. (a) Discuss in detail the various methods in which a binary tree can be represented. Discuss the advantages and disadvantages of each method.

Or

(b) Explain why binary search cannot be performed on a linked list.

14. (a) Compare the working of linear and binary search techniques.

Or

(b) Identify the advantages of bubble sort over insertion sort.

15. (a) Sort the sequence 3, 1, 4, 1, 5, 9, 2, 6, 5 using insertion sort.

Or

(b) Write an algorithm to implement selection sort with suitable example.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the declaration and initialization of multi-dimensional array with suitable example.

17. Analyze the doubly linked list and single linked list. Mention its advantages and disadvantages.

18. Write an algorithm for preorder, inorder and postorder traversal of a binary tree.

19. Write an algorithm for binary search with suitable example.

20. Prepare a quick sort algorithm and explain with suitable example. Give its worst case, average case and best case time complexities.

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D–1480	Sub. Code
	31522

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Second Semester

RELATIONAL DATABASE MANAGEMENT SYSTEMS (RDBMS)

(CBCS 2018/2020 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What are the key components of an ER model?

2. What is the difference between schema and instance in a database?

3. What is the difference between TRUNCATE and DELETE in SQL?

4. What is a foreign key in RDBMS?

5. What is BCNF in normalization?

6. What is a trigger in SQL?

7. What is meant by transaction in a database?

8. What is meant by concurrency control?

9. What are B-Trees in database indexing?

10. Explain the concept of indexing in databases.

SECTION B — (5 × 5 = 25 marks)

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

11. (a) Explain the advantages of using a Database Management System (DBMS) over a traditional file system.

Or

(b) Describe the different types of relationships in ER model.

12. (a) What are the different types of SQL joins?

Or

(b) Explain various SQL constraints.

13. (a) Explain the different types of normal forms in database normalization.

Or

(b) Discus on Nested Queries and Correlated Nested Queries.

14. (a) Explain the importance of transaction management and how it ensures database consistency.

Or

(b) Compare and contrast pessimistic and optimistic concurrency control.

15. (a) Discuss the various storage structures used in databases and their advantages.

Or

(b) Why Performance Tuning is needed for Database? Explain.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain the ER model in detail with suitable examples.

17. Define the term View. Explain Destroying and altering Tables and views.

18. Write the Steps to Normalize an Organization's Database Design.

19. Explain transaction management and concurrency control techniques.

20. Explain the importance of indexing and different types of indexing techniques used in databases.

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D–1481	Sub. Code
	31523

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Second Semester

COMPUTER GRAPHICS

(CBCS 2018/2020 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What are input devices?

2. What are raster scan systems?

3. Define 2D Scaling.

4. What are homogeneous coordinates?

5. What are Beizer curves?

6. Define B-Spline curves.

7. What are projection transforms?

8. What is clipping?

9. Define depth sorting.

10. What are BSP trees?

PART B — (5 × 5 = 25 marks)

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

11. (a) Write a brief note on Flood-fill algorithms with a neat structure.

Or

(b) Differentiate between Random scan and Raster Scan devices.

12. (a) Brief on Sutherland-Hodgeman line Clipping algorithm with a neat diagram.

Or

(b) What is 2D scaling? Explain with a neat structure.

13. (a) Write short notes on Polygon surfaces with a neat structure.

Or

(b) What are hermite curves? Explain.

14. (a) What is 3D translation? Discuss.

Or

(b) Discuss briefly about Polygon clipping with an example.

15. (a) Write a brief note on depth buffer method.

Or

(b) What are octree methods? Discuss.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss in detail about various Input devices used in Computer Graphics.

17. Describe in detail about Cyrus-beck line clipping algorithm with a neat structure.

18. What are B-Spline curves? Explain in detail with a neat structure.

19. Discuss the following, :

    (a) 3D Rotation,

    (b) Viewing coordinates.

20. Elaborate on back-face detection methods.

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D–1482

Sub. Code
31532/34032

DISTANCE EDUCATION

M.C.A./M.C.A. (Lateral Entry) DEGREE EXAMINATION, DECEMBER 2025.

Third Semester

OPERATING SYSTEM

(CBCS 2018/2020 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What are the functions of Operating system?

2. Mention the operations in OS.

3. Mention the types of Scheduling in OS.

4. What is inter process communication?

5. What are the advantages of using semaphore?

6. What is Deadlock avoidance?

7. Define Virtual address.

8. Define page frame.

9. What is File System Mounting?

10. Mention the importance of File sharing in OS.

PART B — (5 × 5 = 25 marks)

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

11. (a) Write short notes on Computer system organization with a neat structure.

Or

(b) Explain brief by about System call with an example.

12. (a) Discuss on Process Scheduling with a neat structure.

Or

(b) What is Multi processor scheduling? Explain.

13. (a) Discuss brief by about Critical section problem.

Or

(b) Brief on Synchronization hardware.

14. (a) Discuss brief by about fixed size partitioning method in contiguous memory allocation method.

Or

(b) Bring out the advantages and disadvantages of using Segmentation in OS.

15. (a) Explain brief by about the File access methods in OS.

Or

(b) Write a brief note on File system structure in OS.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss in detail about the Structure of Operating System.

17. Write detailed notes on Scheduling algorithms with examples.

18. Discuss in detail about the methods of handling Deadlock in OS.

19. Elaborate on swapping in OS with a neat structure,

20. Describe in detail about the types of File Directory in OS.

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D–1483	Sub. Code
	31514

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

First Semester

DISCRETE MATHEMATICS

(CBCS 2021 – 2021 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Show that the proposition $P \vee \neg(P \wedge Q)$ is a tautology.

2. Define power set of a set.

3. Verify that the relation 'greater than or equal to' is partial order relation on the set of integers.

4. If the relation is R = {(1, 1), (1, 3), (2, 2), (3, 1), (3,2)}, then write the matrix of the relation.

5. Define an idempotent element in a binary relation.

6. Let A and B be any two subsets of a universal set U. Then what is $\psi_{A \cap B}(x)$ equal to?

7. Is every cyclic group is abelian?

8. If $a * b = a + b + 2ab, a, b \in R$, find the identity element of R.

9. If $G = (V, E)$ with $V = \{a, b, c, d, e\}$ and $E = \{\{a, b\}, \{a, e\}, \{b, c\}, \{c, d\}, \{d, e\}\}$, then verify G is tree or not.

10. Consider an experiment of throwing a dice. What is the probability of getting an even number?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Show that $(P \to R) \wedge (Q \to R)$ and $(P \vee Q) \to R$ are logically equivalent.

Or

(b) Prove that S is a valid conclusion from $P \to \neg Q$, $Q \vee R, \neg S \to P, \neg R$.

12. (a) If A = {1, 2, 3, 4} and B = {3, 6, 7} and a relation R is defined by {(1, 3), (1, 6), (2, 6), (2, 7), (3, 3), (3, 7), (4, 3), (4, 6)} then write the matrix of R and matrix of inverse of R.

Or

(b) Let R = {(1, 2), (3, 4), (2, 2)} and S = {(4, 2), (2, 5), (3, 1), (1, 3)} Find the following relations $R \circ S$, $S \circ R$, $(R \circ S) \circ R$, $R \circ (S \circ R)$, $R \circ R$, $S \circ S$ and $(R \circ R) \circ R$.

13. (a) If $f : A \to B$ defined by $f(x) = 3x + 1$ and $g : B \to C$ defined by $g(x) = x^2 + 2$ then find $g \circ f$, $f \circ g$, $f \circ f$ and $g \circ g$.

Or

(b) Show that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ by using characteristic function.

14. (a) Prove that intersection of two normal subgroups of a group G is again a normal subgroup of G.

Or

(b) Prove that $G = \{1, \omega, \omega^2\}$ is an abelian group with usual multiplication, where $\omega^3 = 1$.

15. (a) Prove that every non-trivial tree has at least two vertices of degree one.

Or

(b) When rolling a die, what is the probability of occurrence of even number given that the number is greater than 3?

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Prove the validity of the following statement using predicate calculus.

"All animals are mortal. All human beings are animals. Therefore all human beings are mortal".

17. If R and S are binary relations on a set A, then prove that

(a) $(R^{-1})^{-1} = R$

(b) $(R \cup S)^{-1} = R^{-1} \cup S^{-1}$

(c) If $S \subseteq R$, then $S^{-1} \subseteq R^{-1}$.

18. (a) Let A be a non-empty set. If the identity for a binary operation * on a set A exists, then prove that it is unique.

(b) Let * be a binary operation on a set A which is associative and has the identity element $e \in A$. Then, prove that the inverse of every invertible element $a \in A$ is unique.

19. Prove that if G is a finite group and H is a subgroup of G, then the order of H divides order of G.

20. Let S be a sample space defined as "The integers 1 to 15" and B is an event defined as "odd integers" and B' the complement of B is the event defined as "the even integers". If A is the event "prime number" then find the probability of B given that A has already been happened.

D–1484

Sub. Code
31521

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Second Semester

ACCOUNTING AND FINANCIAL MANAGEMENT

(CBCS 2020 – 2021 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define Financial Accounting.

2. What is a Ledger?

3. What is Marginal Costing?

4. Define Break-Even Analysis.

5. What is Variance Analysis?

6. Define Flexible Budgeting.

7. What is Risk Capital?

8. Define the Time Value of Money.

9. What is Weighted Average Cost of Capital (WACC)?

10. Define Capital Structure.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) The following balances were extracted from the ledger of Rajkumar on 31st March 2012. You are requested to present a Trial Balance as on that date in the proper form.

Particulars	Amount	Particulars	Amount
Cash in Hand	2,500	Furniture	12,000
Cash at Bank	14,500	Debtors	18,200
Capital	70,000	Creditors	16,600
Drawings	9,000	Opening stock	8,700
Purchases	60,000	Wages	6,700
Sales	82,000	Salary	10,400
Machinery	35,000	Bills payable	8,400

Or

(b) B.M Company presents the following information and you are required to calculate funds from operations.

Particulars	Amount	Particulars	Amount
To expenses		By gross profit	2,00,000
Operation	1,00,000	By gain on	
Depreciation	40,000	sale of plant	20,000
To Loss on			
sale of building	10,000		
To advertisement			
suspense A/C	5,000		
To discount			
Allowed to customers	500		
To discount on			
issue of shares	500		
To good will written off	12,000		
To net profit	52,000		
Total	2,20,000	Total	2,20,000

12. (a) From the following information calculate work cost.

Materials Rs. 64,500: Direct Wages – Rs. 80,000, Factory Overheads – Rs. 29,500, Opening stock of work in progress Rs. 13,000 and closing stock of work in progress Rs. 34,500.

Or

(b) Discuss the uses of cost accounting.

13. (a) The Budgeted expenses for the production of 10,000 units in a factory are given as follows.

Materials – Rs. 70 per unit,

Labour – Rs. 25 per unit

Variable overheads – Rs. 20 per unit,

Fixed Overheads (1,00,000) – Rs. 10 per unit

Direct Variable Overheads – Rs. 5 per unit,

Administrative Expenses (Rs. 50,000) – Rs. 5 per unit

Selling Expenses (15% fixed) – Rs. 13 per unit

Distribution expenses (20% fixed) – Rs. 7 per unit

Total cost of sales per unit – Rs. 155 per unit

You are required to prepare a budget for the production of 8,000 units.

Or

(b) Calculate labour cost variance and labour rate of pay variance.

Particulars	Amount
Gross wages direct	28,080
Standard hours produced	8,640
Standard rate per hour	3
Actual hours worked	8,200

14. (a) Analyze the factors affecting the Time Value of Money.

Or

(b) Develop the estimation of working capital requirements.

15. (a) Compute the computation of the cost of capital for equity sources.

Or

(b) Examine the determinants of Capital Structure and their impact on financial decisions.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Create the Trading and Profit and Loss account for the year ending 31st March 2001 and a Balance Sheet as on that date.

Particulars	Amount	Particulars	Amount
Capital	52,000	Sales returns	5,200
Sales	1,01,000	Printing and stationery	240
Purchases returns	1,900	Sundry debtors	31,000
Opening stock	22,000	Purchases	72,000
Furniture and fittings	5,500	Rent	560
Sundry creditors	6,200	Carriage inwards	390
Investments	16,700	Bad debts	160
Salaries	1,800	Postage and telegram	210
Travelling expenses	550	Cash at bank	3,270
Wages	1,300	Insurance	220

Adjustments :

(a) Salaries Outstanding Rs. 150.

(b) Closing stock Rs. 18,500.

(c) Insurance was prepaid Rs. 30.

(d) Charge 10% depreciation on furniture.

17. The sales turn over and profit during two year as follows.

Year	Sales	Profit
2013	1,40,000	15,000
2014	1,60,000	20,000

You are required to calculate :

(a) P/V Ratio

(b) Sales required to earn a profit of Rs. 40,000

(c) Profit when sales are Rs. 1,20,000.

18. The expenses for the production of 5,000 units in a factory are given as follows.

Materials – Rs. 50 per unit

Labour – Rs. 20 per unit

Variable overheads – Rs. 15 per unit

Fixed Overheads (Rs. 50,000) – Rs. 10 per unit

Administrative Expenses (5% Variable) – Rs. 10 per unit

Selling Expenses (20% fixed) – Rs. 6 per unit

Distribution expenses (10% fixed) – Rs. 5 per unit

Total cost of sales per unit – Rs. 116 per unit

You are required to prepare a budget for the production of 7,000 units

19. Explain the concept of Risk Capital and the methods of risk management in financial decisions.

20. Discuss the different types of dividend policies and their impact on shareholders.

D–1485

Sub. Code
31524

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Second Semester

VISUAL PROGRAMMING WITH .NET

(CBCS 2020 – 2021 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What is the use of the Solution Explorer in Visual Studio?

2. What is a Status Bar in Visual Studio?

3. Why is the Program class important in a C# console application?

4. What is the purpose of the using directive in C#?

5. Define a delegate in C#.

6. What is the AssemblyName property used for?

7. What does Debug and Release configurations describes?

8. What is the use of Table Designer?

9. What are the two sections of designer?

10. What are the three objects of MVC?

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Describe any five types of Visual Studio projects.

Or

(b) Explain the role of the Menu and Toolbar in Visual Studio.

12. (a) Explain the basic structure (code skeleton) of a C# program.

Or

(b) Explain the concept of method snippets in C#.

13. (a) What is the difference between 'Build', 'Rebuild' and 'Clean' in Visual Studio?

Or

(b) Describe how to implement an interface in C#.

14. (a) Write the note on the following :

(i) Watch window

(ii) Immediate window

(iii) Call stack window.

Or

(b) How you will create a database? Explain.

15. (a) What are the different types of layouts in WPF? Explain.

Or

(b) Write the code for creating an event handler.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain in detail the different parts of the Visual Studio IDE.

17. Explain enums in C#. Write a program that defines an enum for days of the week and displays a selected day.

18. Describe the process of implementing an interface and explain how it enhances abstraction and polymorphism in C#. Include a code sample.

19. What are the various options from the Breakpoint Context Menu? Explain.

20. Discuss about various managing windows for controls.

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D–1486	Sub. Code
	31531

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Third Semester

SOFTWARE ENGINEERING

(CBCS 2020 – 2021 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define software myths.

2. What is layered technology in software engineering?

3. List the tasks involved in requirement engineering.

4. Define data modeling concepts.

5. What are key design concepts in software engineering?

6. Define architectural styles.

7. State black box testing.

8. List different testing strategies used in object-oriented software.

9. Define software risk.

10. What is ISO 9000 quality standard?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain the role of software in modern society with example.

Or

(b) Compare and contrast evolutionary process models with the unified process model.

12. (a) Explain the difference between scenario-based and flow-oriented modeling.

Or

(b) Access the effectiveness of requirement analysis in reducing software failures.

13. (a) Explain about the golden rules of user interface details.

Or

(b) Summarize the design process and quality attributes.

14. (a) Differentiate validation testing and system testing.

Or

(b) Analyze product metrics for source code and design models.

15. (a) Describe about the risk identification.

Or

(b) Write note on software quality assurance.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Analyze the importance of process assessment for software teams.

17. Analyze the role of behavioral molding in object-oriented analysis.

18. Create an architectural design for a hospital management system.

19. Explain about the metrics for software quality and software process.

20. Give an account on risk projection, risk refinement.

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D–1487

Sub. Code
31533

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Third Semester

INTERNET AND JAVA PROGRAMMING

(CBCS 2020 – 2021 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define Internet and its basic services.

2. What is IRC?

3. List the basic concepts of OOP.

4. State the Tokens.

5. What is a constructor?

6. Define interface in Java.

7. State multithreading.

8. Define applet.

9. State the streams in Java.

10. What is random access file?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain the working of DNS with an example.

Or

(b) Use FTP to upload a file to a web server.

12. (a) Demonstrate the use of command-line arguments in Java.

Or

(b) Write a Java program using IF... ELSE statement.

13. (a) Explain method overloading with an example.

Or

(b) Differentiate between arrays and vectors.

14. (a) Write a Java program to create a thread using Runnable.

Or

(b) Create a Java applet to draw circles and rectangles.

15. (a) Explain the concepts of stream classes.

Or

(b) Illustrate random access file handling in Java.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain the difference between Telnet and FTP.

17. Write a Java program using a For Loop to display a multiplication table for a given number.

18. Implement a program using One-dimensional and Two-dimensional arrays.

19. Justify the use of exception handling for debugging with neat example program.

20. Implement a program to copy contents of one file into another.

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D–1488	Sub. Code
	31534

DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Third Semester

COMPUTER NETWORKS

(CBCS 2020 – 2021 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. List any four applications of computer networks.

2. What are the different types of transmission modes?

3. Define CRC.

4. List the types of ARQ protocols.

5. Define circuit switching.

6. What is congestion in networking?

7. What is process-to-process delivery?

8. State RPC.

9. What do you meant by cryptography?

10. Define RSA algorithm.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain line configurations with neat diagram.

Or

(b) Compare bus, star and ring topologies with respect to reliability and cost.

12. (a) Describe block coding with an example.

Or

(b) Analyze the efficiency of CSMA/CA in wireless communication.

13. (a) Illustrate the working of datagram subnet with example.

Or

(b) Differentiate between static and dynamic routing.

14. (a) Compare and contrast between TCP and UDP.

Or

(b) Describe about the DNS.

15. (a) Demonstrate how substitution cipher works with an example.

Or

(b) Use symmetric key encryption for securing a file transfer application.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Analyze the performance difference between analog and digital signals.

17. Evaluate the effectiveness of sliding window protocol in high latency networks.

18. Justify the use of packet switching in Internet communication.

19. Compare and contrast the connection oriented and connectionless services with example.

20. Differentiate between DES, AES and RSA.

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DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Third Semester

DATA MINING AND WAREHOUSING

(CBCS 2020 – 2021 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What is the role of a warehouse server?

2. Define data quality.

3. What is the role of a decision tree?

4. Define frequent itemset.

5. List two real-world applications of GA.

6. Define categorical clustering.

7. What is meant by web usage mining?

8. Define spatial data mining.

9. What is MapReduce?

10. Define Big Data.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain OLAP operations with examples.

Or

(b) Explain the importance of data transformation and reduction.

12. (a) Write short notes on Bayesian classification.

Or

(b) Differentiate between supervised and unsupervised learning in data mining.

13. (a) Write short notes on hierarchical clustering.

Or

(b) Explain about neural network with a diagram.

14. (a) Write short notes on text clustering techniques.

Or

(b) Explain the importance of temporal mining in financial analysis.

15. (a) Discuss the advantages and disadvantages of Hadoop.

Or

(b) Explain the five V's of Big Data with real-world examples.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss in detail different warehouse schemas with examples.

17. What is Apriori algorithm? Explain with step-by-step procedure with example.

18. Define machine learning. Explain supervised and unsupervised learning with examples.

19. Explain how Weka tool supports various machine learning algorithms with examples.

20. What is Hadoop? Explain in detail its core components with diagrams.

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DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Fourth Semester

INTERNET OF THINGS (IOT)

(CBCS 2020 – 2021 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. List any four key characteristics of IoT.

2. What is the role of sensors in the physical design of IoT?

3. Define Machine-to-Machine (M2M) communication.

4. List any two communication modules used in IoT.

5. What is Arduino and why is it used in IoT?

6. Why is cloud storage important in IoT applications?

7. What is the use of the range( ) function in loops?

8. Mention any two string operators with examples in Python.

9. What is the difference between 'in' and 'not in' operators in sets?

10. Which Python library is used to send emails and how?

PART B — (5 × 5 = 25 marks)

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

11. (a) Describe the physical design of an IoT system with suitable examples.

Or

(b) Compare and contrast IoT protocols with traditional Internet protocols.

12. (a) Explain the significance of SDN and NFV in IoT.

Or

(b) Describe the key steps involved in the IoT Design Methodology.

13. (a) How does Smart Grid benefit from IoT technology?

Or

(b) Write a short note on tools for IoT software and management.

14. (a) Differentiate between local and global variables in Python.

Or

(b) Write a Python function to calculate the square of a number.

15. (a) Describe list methods with examples.

Or

(b) Differentiate between list and tuple in Python.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Analyze the major challenges in the implementation of IoT and suggest possible solutions.

17. Elaborate the architecture and components of M2M and IoT. Also explain their interrelation.

18. Describe the design and implementation of a Home Automation system using IoT.

19. Write a Python program that uses all decision-making statements (if, if-else, nested if, and multi-way if-elif-else).

20. Discuss in detail about lists in Python including creation, indexing, slicing methods.

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DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Fourth Semester

ARTIFICIAL INTELLIGENCE AND SOFT COMPUTING

(CBCS 2020 – 2021 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define Artificial Intelligence.

2. What is constraint satisfaction in AI search problems?

3. Define predicate logic and its role in AI.

4. List out any two main issues in knowledge representation.

5. What is meant by Soft Computing?

6. Describe about learning process in neural networks.

7. What is fuzzy sets?

8. Define fuzzy set operations with an example.

9. What is a Genetic Algorithm (GA) and how does it work?

10. Define the role of fitness function in Genetic Algorithms.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Apply the Generate-and-Test heuristic search technique to solve a simple problem.

Or

(b) Explain about Simple Hill Climbing algorithm to optimizing a given function.

12. (a) Briefly explain the limitations of procedural knowledge compared to declarative knowledge.

Or

(b) Discuss the role of ISA relationships in hierarchical knowledge representation.

13. (a) Analyze the strengths and weaknesses of ANN models in data classification.

Or

(b) Evaluate how soft computing techniques handle uncertainty and imprecision.

14. (a) Discuss about Properties of Fuzzy Sets.

Or

(b) Explain various methods of membership value assignment.

15. (a) Give a short note on selection, crossover and mutation in Genetic Algorithms.

Or

(b) Evaluate the limitations of Genetic Algorithms compared to other heuristic optimization techniques.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. What is Production System in AI? Compare various types of production systems used in AI.

17. Analyze various knowledge representation approaches in Artificial Intelligence.

18. How the Hebb learning rule can be applied to train a simple neural network? Explain in detail.

19. Discuss about fuzzification and defuzzification with example.

20. Analyze various classifications of Genetic Algorithms with example.

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DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Fourth Semester

BIG DATA ANALYTICS AND R PROGRAMMING

(CBCS 2020 – 2021 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Write short notes on Big data characteristics.

2. List out the use of data analytics.

3. Recall algorithms using MapReduce.

4. Mention applications of nearest neighbor search.

5. What is NoSQL?

6. How NoSQL is used to manage big data?

7. Describe features of R programming.

8. Show an example for break statement.

9. Define arrays.

10. What is known as data reshaping?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Categorize types of big data.

Or

(b) Illustrate infrastructure for big data.

12. (a) How to find similar items in big data? Explain it.

Or

(b) Comment on NoSQL business drivers.

13. (a) Recall history of R Programming.

Or

(b) Demonstrate nested if in R programming.

14. (a) Write notes on built-in functions with an example.

Or

(b) Discuss vector manipulation.

15. (a) Classify various operations on matrix using R.

Or

(b) How to install a new package in R? Explain it.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Compare traditional versus big data approaches.

17. Briefly explain MapReduce.

18. Comment on NoSQL.

19. Write notes on decision-making statements in R with an example.

20. Explain about melting and casting.

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DISTANCE EDUCATION

M.C.A. DEGREE EXAMINATION, DECEMBER 2025.

Fourth Semester

MOBILE APPLICATION DEVELOPMENT

(CBCS 2020 – 2021 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Write short notes on operating systems in the mobile ecosystem.

2. Describe services of the mobile ecosystem.

3. Give notes on mobile web widgets.

4. Recall games application.

5. Summarize click streams.

6. How to design mobile based on different screen sizes?

7. Define event handling.

8. Show various languages of J2ME.

9. Give notes on the emulator.

10. Write short notes on Microsoft Windows Phone.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Describe about devices of the mobile ecosystem.

Or

(b) Examine application frameworks in the mobile ecosystem.

12. (a) Categorize mobile applications.

Or

(b) Comment on enterprise apps.

13. (a) Illustrate mobile information architecture.

Or

(b) Write in briefly about mobile design.

14. (a) Summarize J2ME architecture.

Or

(b) Discuss MIDlet programming.

15. (a) Compare Emulator and Android AVD.

Or

(b) Differentiate Apple IOS and RIM Blackberry.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Mobile ecosystem an outline.

17. Briefly explain about mobile device apps.

18. Classify mobile design.

19. Write in briefly about small computing device requirements.

20. Explain about development frameworks of android development.

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