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.

———————

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.

———————

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.

———————

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.

———————

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.

———————