S–1258

Sub. Code
23MCE1C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Computer Science

ANALYSIS AND DESIGN OF ALGORITHMS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define Algorithm.
2. State the recurrence relation for the Tower of Hanoi problem.
3. What is Divide and conquer strategy?
4. Give the principle behind the greedy method.
5. What is the knapsack problem?
6. Write the difference between Warshall's and Floyd's algorithm.
7. Define backtracking with an example.
8. Differentiate between backtracking and branch and bound.
9. What is approximation algorithm?
10. Write one application of knapsack approximation algorithm.

Part B (5 × 5 = 25)

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

11. (a) Derive the time complexity of non-recursive algorithm with a simple example.

Or

(b) Solve the Tower of Hanoi problem for $n = 3$ disks using recursion.

12. (a) Find the closest pair of points problem using Divide and Conquer.

Or

(b) Explain Dijkstra's algorithm with an example.

13. (a) Apply Warshall's algorithm to a sample directed graph.

Or

(b) Explain Floyd's algorithm for all pairs shortest path problem.

14. (a) Solve the N-Queens problem for $n = 4$ using backtracking.

Or

(b) Explain the assignment problem using branch and bound.

15. (a) Explain approximation algorithms for traveling salesman problem.

Or

(b) Why are NP-complete problems important in computer science?

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain the framework for the analysis of algorithm efficiency. Illustrate with an example.

17. Explain Strassen's matrix multiplication algorithm with complexity analysis.

18. Derive the dynamic programming solution for the 0/1 knapsack problem with an example.

19. Describe the backtracking approach for solving N-Queens problem and derive the complexity.

20. Explain P, NP and NP complete problems with examples and diagram.

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S–1259

Sub. Code
23MCE1C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Computer Science

OBJECT ORIENTED ANALYSIS AND DESIGN

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is class?

2. Define the term inheritance.

3. Write short note on states.

4. What is object models?

5. Give two advantages of object oriented analysis.

6. Brief the concept of relationship.

7. Give a note on breaking system.

8. Define the term subsystems.

9. Define the term internal classes and operations.

10. Give a note on dynamics model.

Part B (5 × 5 = 25)

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

11. (a) Brief the concept of abstract class.

Or

(b) Define key and constraints. Explain in detail.

12. (a) Explain the concept of junctional to object models.

Or

(b) Write short note on advanced dynamic model.

13. (a) Briefly explain the object model diagram with example.

Or

(b) How to identify events and analyze the applicability of actions.

14. (a) Explain the concept of breaking system into subsystems.

Or

(b) Illustrate the uses of subsystems to processes.

15. (a) Write short note on two way associations in object design.

Or

(b) Demonstrate the use of functional model.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the concept of object oriented development.

17. What is data flow diagram? Explain the main parts of a DFD.

18. How to identify object and group into classes? Explain through example.

19. Draw and explain the architecture of ATM system.

20. Describe the different implementation control in object design.

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S–1260

Sub. Code
23MCE1C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Computer Science

PYTHON PROGRAMMING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What do you mean by escape sequence?

2. Mention the uses of assignment statement.

3. Write short note on data structure.

4. Define the term list.

5. What is object?

6. State the use of relational number.

7. Write short note on super user.

8. What do you mean by migrate commands?

9. Mention the use of object relational mapping.

10. What is deleting objects in query set?

Part B (5 × 5 = 25)

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

11. (a) Explain the concept of multiway if statements with example.

Or

(b) Describe the structure of a while loop statement with example.

12. (a) Brief the concept of parameters and temporary variables.

Or

(b) Write short note on tracing and recursive function.

13. (a) Illustrate the concept of abstract classes.

Or

(b) What is operator overloading? Explain through example.

14. (a) How to create and apply migrations in blog data schema? Explain.

Or

(b) Discuss in detail about basic model for blog posts.

15. (a) How to use the filter() method in query set? Explain through example.

Or

(b) How will you creating templates for your views? Explain.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss in detail about numeric data types and character sets.

17. Define – NameSpace. Explain the list methods for inserting and removing elements.

18. What is called GUI? Describe the concept of event driven programming.

19. What is blog? Explain the concept of designing the blog data schema.

20. Define – URL. Explain the adding URL patterns for your news in Django?

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S–1261

Sub. Code
23MCE1E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Computer Science

Elective – ADVANCED SOFTWARE ENGINEERING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is meant by problem domain?

2. Define the term software engineering.

3. What is meant by axiomatic specification?

4. What is the need for requirement analysis?

5. List any two project estimation techniques.

6. What is risk?

7. Define the term cohesion.

8. Define the term coupling.

9. What is meant by debugging?

10. Name any two Testing tools.

Part B (5 × 5 = 25)

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

11. (a) Describe the characteristics of software process.

Or

(b) Bring out the challenges faced by software engineering.

12. (a) Write short notes on software quality management.

Or

(b) What is ISO 9000 standard? Explain briefly.

13. (a) State the responsibilities of a software project manager.

Or

(b) Bring out the metrics used in project estimation and explain their purpose.

14. (a) Describe the characteristics of good software design.

Or

(b) Discuss on IEEE recommended practice for Software design description.

15. (a) Write short notes on software reengineering.

Or

(b) Explain briefly about reliability estimation and its necessity.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain anyone software development process model.

17. Explain in detail about requirement analysis.

18. Explain COCOMO model for software project estimation.

19. Explain in detail about function-oriented software design.

20. Explain in detail about software testing process.

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S–1262	Sub. Code 23MCE1E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

First Semester

Computer Science

Elective – EMBEDDED SYSTEMS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What does 8051 and 8084 refers?

2. Mention any two external memories.

3. Give the function of ANL instruction.

4. 1024 bits = __?__ KB.

5. Name two common states of a task in an RTOS.

6. Give the purpose of message queue in RTOS.

7. List any two functions of a scheduler.

8. What is address offset?

9. What is an instruction stimulator?

10. Differentiate linker and loader.

Part B (5 × 5 = 25)

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

11. (a) Draw and explain 8051 micro controller architecture.

Or

(b) How does the timer work in the 8051 microcontroller?

12. (a) How does keyboard acted as an interface with 8051 microcontroller?

Or

(b) Explain pulse with measurement done in 8051 micro controller.

13. (a) Discuss shortly memory management function of an RTOS.

Or

(b) Write a note on inter task communication.

14. (a) Compare memory management techniques in RTL and QnX.

Or

(b) Exemplify saving memory space in RTOS.

15. (a) Give an account on debugging techniques.

Or

(b) Demonstrate how to get embedded software into target systems.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. What is an interrupt? Discuss it with neat diagrams.

17. Give a detailed account on Addressing modes.

18. Explain various interrupt routines in an RTOS environment.

19. Demonstrate hard real time scheduling.

20. Design a testing strategy for embedded software that include both host machine testing and laboratory tools.

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S–1263

Sub. Code
23MCE2C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025.

Second Semester

Computer Science

DATA MINING AND DATA WAREHOUSING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Mention the different data repositories on which data mining can be performed.

2. Expand DWT and PCA.

3. What are based on a multidimensional data model?

4. List out OLAP operations.

5. Give the two step process of ARM.

6. What is the use of relevance analysis?

7. List the types of data occur in cluster analysis.

8. What is dendogram?

9. What are the contents of web log?

10. What does data science refers?

Part B (5 × 5 = 25)

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

11. (a) Summarize data mining primitives.

Or

(b) What are all involved in data transformation? Explain.

12. (a) Analyze that meta data should be stored and managed persistently.

Or

(b) How do data warehousing and OLAP relate to data mining?

13. (a) How to improve the efficiency of Apriori? Explain.

Or

(b) Explain Adaptive Probabilistic Networks.

14. (a) Is PAM, a k-medoids partitioning algorithm?

Or

(b) Demonstrate distance calculation.

15. (a) Write about the basic measures for test retrieval.

Or

(b) Explain the working of search engine.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Construct a scatter plot for the data set.

17. Draw and explain a three-tier data warehouse architecture.

18. Discuss information gain and its attribute selection measure.

19. How effective is BIRCH? Explain.

20. Discuss spatial data mining.

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S–1264

Sub. Code
23MCE2C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Second Semester

Computer Science

PRINCIPLES OF COMPILER DESIGN

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. List some useful compiler construction tools.

2. Give the regular expression of identifier and digit.

3. Mention the types of parser.

4. What is the advantage of Augment Grammar?

5. Give two examples for three address code.

6. Give the equation for SDT.

7. List any four data structures of symbol table.

8. Name the functions of error handler.

9. Give the use of induction variable elimination.

10. What is address descriptor?

Part B (5 × 5 = 25)

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

11. (a) What are all consists of finite automata? Explain.

Or

(b) Give a complete note on the role of the lexical analyzer.

12. (a) Differentiate LL and LR parsing.

Or

(b) Exemplify derivation in parser.

13. (a) Give an account on Syntax Directed Translation Scheme.

Or

(b) Explain postfix notation with example.

14. (a) Explain the representation of scope information in symbol table.

Or

(b) Summarize the operations of symbol table.

15. (a) Give a brief note on Strength reduction with example.

Or

(b) Explain peephole optimization in detail.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss in detail about compiler with diagram and also explain various phases in it.

17. Summarize shift reduce parsing.

18. Explain the translation of assignment statement.

19. Explain the implementation of stack allocation.

20. Summarize - function preserving transformation.

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S–1265

Sub. Code
23MCE2C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Second Semester

Computer Science

ADVANCED JAVA PROGRAMMING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is Even Handling in Java?

2. What is a Thread?

3. What is RMI?

4. Define object serialization in Java.

5. What is JDBC?

6. How do you interact with a Database using JDBC?

7. What is a Servlet?

8. Define JSP.

9. What is the purpose of JAR files in Java?

10. What is Internationalization in Java?

Part B (5 × 5 = 25)

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

11. (a) Explain the basics of Java programming and its components.

Or

(b) Describe the role of socket class in establishing client-side connections.

12. (a) Discuss about the process of creating and activating remote objects in RMI.

Or

(b) Discuss applications of Javaspaces in distributed systems, such as enabling communication and coordination between process?

13. (a) Explain about the principle of JDBC and Database Access.

Or

(b) Describe how to interact with a database using JDBC.

14. (a) Discuss about the anatomy of a Java Servlet and its lifecycle.

Or

(b) Explain how to work with cookies in Java Servlets.

15. (a) Describe the benefits of using JAR files in Java.

Or

(b) Explain the key features and benefits of using swing for GUI development in Java.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Design a Java program that demonstrate media techniques.

17. Demonstrate the creation of stubs and skeletons using RMI.

18. Discuss about the role of Database support in web applications.

19. Discuss how scriptlets enable embedding java code within JSP pages and their role of dynamic content generation.

20. Design and implement a simple calculator program in Java using swing that performs basic arithmetic operations (+, –, *, /) and a clear button.

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S–1266

Sub. Code
23MCE2E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Second Semester

Computer Science

Elective – ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. How AI helps in the field of education?

2. Define artificial intelligence.

3. What is meant by property inheritance inference?

4. Write down the issues in knowledge representation.

5. What is backward – chaining rule system?

6. Define persistence.

7. How big data differs from data mining?

8. List down the applications of machine learning.

9. What is the purpose of dimentionality reduction?

10. Define clustering.

Part B (5 × 5 = 25)

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

11. (a) Write down the algorithm of breadth – first search.

Or

(b) Briefly discuss on state space search.

12. (a) Outline the frame problem.

Or

(b) Write a brief note on relationships among attributes.

13. (a) Elaborate on combining forward and backward reasoning.

Or

(b) How instance and ISA relationships represented?

14. (a) Write a note on role of statistics with machine learning.

Or

(b) Discuss on importance of the hybrid cloud.

15. (a) List down the steps in machine learning cycle.

Or

(b) Write a short note on the process of data preparation.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Assess – "How will we know if we have constructed machine that is intelligent"?

17. Discuss about simple hill climbing method.

18. Describe about resolution in prepositional logic.

19. Discuss in detail about the various approaches to machine learning.

20. Elaborate about types of machine learning algorithms.

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S–1268

Sub. Code
23MCE3C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

Computer Science

DIGITAL IMAGE PROCESSING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define Digital Image processing.
2. What is image sampling and quantization?
3. Mention two arithmetic/logic operations used for image enhancement.
4. What is image enhancement in the spatial domain?
5. What is image restoration? How does it differ from image enhancement?
6. Give two types of Geometric transformations used in image restoration.
7. What is image compression and why is it important?
8. Name two commonly used image compression standards.
9. Define edge detection in image segmentation.
10. What is thresholding in image segmentation?

Part B (5 × 5 = 25)

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

11. (a) Describe the components of an image processing system.

Or

(b) Differentiate between linear and nonlinear operations in image processing.

12. (a) Explain basic gray level transformations with examples.

Or

(b) How can spatial enhancement methods be combined to improve image quality?

13. (a) Explain the image degradation/Restoration process model.

Or

(b) What is the minimum mean square error filter, and how does it work?

14. (a) Describe the role of information theory in image compression.

Or

(b) Discuss error-free (lossless) compression techniques with examples.

15. (a) Explain the different types of discontinuities used in edge detection.

Or

(b) How does the watershed algorithm work in morphological segmentation.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain light and electromagnetic spectrum in the context of image acquisition and processing.

17. Discuss different spatial filtering techniques used for image enhancement.

18. Describe in detail the different noise models and their impact on image quality. Explain methods to remove noise effectively.

19. Explain different image compression models in detail.

20. Discuss different edge detection techniques and their role in image segmentation.

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S–1269

Sub. Code
23MCE3C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

Computer Science

CLOUD COMPUTING

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What does the term "cloud computing" mean?

2. What is one challenge in creating cloud services?

3. How does cloud computing support better email systems?

4. How does cloud computing help businesses plan and manage projects?

5. Why are online calendars important in cloud computing?

6. In what way do cloud services help manage spreadsheets and databases?

7. What is one important feature to check in web conferencing tools?

8. How do online wikis support team collaboration?

9. How would you define cloud storage?

10. Name one advantage of using online photo editing applications.

Part B (5 × 5 = 25)

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

11. (a) Outline the early development and basic idea of cloud computing.

Or

(b) Discuss the methods used to build and find cloud services.

12. (a) Discuss the impact of cloud computing on community email systems.

Or

(b) Explain how cloud computing improves scheduling and project planning in companies.

13. (a) Describe how online scheduling aids in everyday task management.

Or

(b) Explain the advantages of using cloud service for document and data management.

14. (a) Explain what factors to consider when choosing web mail and instant messaging tools.

Or

(b) Discuss how social networks help form online groups.

15. (a) Discuss why cloud storage is essential for saving files online.

Or

(b) Describe how online photo sharing and editing tools improve digital content management.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Critically discuss the evolution of cloud computing, including its definition, benefits, and service creation process.

17. Evaluate how cloud computing improves communication and project management for both communities and companies.

18. Discuss how cloud services enhance scheduling, task management, document handling in daily work.

19. Analyze the importance of external cloud tools like web conferencing, instant messaging. and online group platforms in improving communication.

20. Evaluate the impact of cloud storage and online sharing tools on managing digital information.

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S–1270

Sub. Code
23MCE3C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

Computer Science

DATA SCIENCE AND ANALYTICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define Data Science.

2. List any two applications of Data Science in real –world scenarios.

3. What are the main types of Machine Learning?

4. List the key phases of the Data Analytics life cycle.

5. Define dirty data.

6. What is the difference between data exploration and data presentation?

7. Define Decision Tree and mention one real-world application.

8. What is Baye's theorem in probability?

9. Differentiate linear regression and logistic regression.

10. What is the purpose of categorizing documents by Topics?

Part B (5 × 5 = 25)

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

11. (a) Differentiate between Data Science and big data analytics.

Or

(b) Discuss the ethical consideration in Data science.

12. (a) Describe the key stages of the Data Analytics life cycle.

Or

(b) How does machine learning contribute to Data Analytics? Provide an example.

13. (a) What are descriptive statistics? How are they used in data analysis.

Or

(b) Explain the K-means clustering algorithm and its use cases.

14. (a) Describe the naive Bayes classifier and its assumptions.

Or

(b) Explain the concept of Association rules with an example.

15. (a) How does logistic regression work, and where is it used?

Or

(b) Explain the significance of TF-IDF in text mining.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the Data science process in detail with a suitable example.

17. Discuss different Machine Learning techniques and their applications in Data Analytics.

18. Describe the exploratory data analysis process in R and explain its importance in data analytics.

19. Discuss the process of implementing a decision tree in R and a case study.

20. Discuss different regression methods used in Data Analytics and their applications.

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S–1271

Sub. Code
23MCE3E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

Computer Science

Elective – NETWORK SECURITY AND CRYPTOGRAPHY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is meant by cryptography?

2. How assymmetric algorithm works?

3. What is the importance of key exchange?

4. Expand RSA and MAC.

5. Define authentication.

6. What is meant by PGP?

7. Write down the rules to set the best password.

8. How SSL works?

9. Define network forensic.

10. What is the purpose of water marking?

Part B (5 × 5 = 25)

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

11. (a) Write a brief note on AES.

Or

(b) How stream, cipher differs from block cipher?

12. (a) Write a short note on digital signatures.

Or

(b) Describe ECC, in short.

13. (a) Explain X.509 authentication services.

Or

(b) Describe about S/MIME.

14. (a) Write a short note on web security.

Or

(b) List down the purpose of firewall.

15. (a) Write about stenography.

Or

(b) Describe about DNA cryptography.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss about Triples DES, in detail.

17. Explain the RSA algorithm with neat diagram.

18. Elaborate on Kerberos.

19. Explain in detail about VIRUS.

20. Explain about Quantum cryptography.

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S–1272

Sub. Code
23MCE3E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025.

Third Semester

Computer Science

Elective : ADVANCED INTERNET OF THINGS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define IoT and mention any two key characteristics of IoT.

2. List two major applications of Industrial IoT (IIOT).

3. Define electric current.

4. Explain the difference between analog and digital signals.

5. What is the purpose of the setup( ) and loop( ) functions in Arduino programming?

6. List any two data types available in C for Arduino.

7. Define an actuator.

8. How does an infrared (IR) sensor detect objects?

9. Which protocol is commonly used to send sensor data over the internet using Node MCU?

10. What is the purpose of the Arduino IDE when working with Node MCU?

Part B (5 × 5 = 25)

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

11. (a) Describe the steps involved in developing an IoT application.

Or

(b) Explain the basic architecture of IoT with a neat diagram.

12. (a) Convert the binary number 110101 to Hexadecimal.

Or

(b) Explain the relationship between voltage, current and resistance using Ohm's Law.

13. (a) Describe the use of for, while and if statements with syntax and examples.

Or

(b) Write a short program to read data from the serial monitor and print it back using Arduino's serial library.

14. (a) Explain how an analog temperature sensor can be interfaced with Arduino.

Or

(b) Describe the working principle of an ultrasonic sensor.

15. (a) Explain how to set up the Arduino IDE for programming the ESP8266 Node MCU.

Or

(b) Describe the process of connecting a temperature sensor to Node MCU.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the applications of IoT in healthcare, smart cities and agriculture with examples.

17. Explain in detail the process of digital-to-analog conversion and its role in IoT systems.

18. Write a detailed explanation of using Arduino C library functions for mathematical operations.

19. Discuss the working and applications of digital and analog sensors.

20. Discuss the steps involved in programming Node MCU to connect Wi-Fi and transmit sensor data to the cloud.

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S–1273

Sub. Code
23MCE4C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

Fourth Semester

Computer Science

DISTRIBUTED OPERATING SYSTEM

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Mention the types of computers according to manufacturing.
2. What does reliability refers?
3. List the issues related to correctness.
4. What does 1-reliable implies?
5. List out the different types of call semantics used in RPC systems.
6. What does seek (fid, position) specifies?
7. Mention the drawbacks of centralized clock synchronization algorithm.
8. Quote the conditions for a deadlock situation.
9. Expand ACID and HDFS.
10. What is a stateless file server?

Part B (5 × 5 = 25)

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

11. (a) Explain work-station server model in detail.

Or

(b) Compare network and distributed operating systems based on their features.

12. (a) Sketch out any five features of a good message passing system.

Or

(b) Explain process addressing in message based communication.

13. (a) How to achieve the goal of semantic transparency?

Or

(b) Illustrate RRR protocol with neat diagram.

14. (a) Examine RNME strategy.

Or

(b) Give an account on Bully Algorithm.

15. (a) Summarize quorum based protocol.

Or

(b) Explain stateful file servers.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Give a detailed account on various distributed computing environment.

17. Discuss in detail commonly used semantics for ordered delivery of multicost messages.

18. Explain client server binding in RPC.

19. Demonstrate event ordering.

20. Discuss distributed transaction service shortly.

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