M.Sc. DEGREE EXAMINATION, APRIL 2024

First Semester

Computer Science

ANALYSIS AND DESIGN OF ALGORITHMS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

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

Answer **all** questions.

1. What is an algorithm?

2. Apply Euclid's algorithm to find the GCD of 120, 48.

3. What is the largest number of key comparisons made by binary search in searching for a key in the following array 10, 12, 11, 9, 13, 7, 6, 8, 1,2,4, 3, 5.

4. State the central points of Greedy technique and mention any two algorithms that follow Greedy technique.

5. What does dynamic programming have in common with Divide and Conquer?

6. What is the purpose of Memory Function technique in dynamic programming?

7. Differentiate Backtracking and Branch-and-Bound technique.

8. Define n-Queens Problem.

9. What data structure can be used to keep track of live nodes in a best-first branch-and-bound algorithm?

10. What are NP and NP-complete problems?

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

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

11. (a) Discuss about the basic asymptotic efficiency classes in detail.

Or

(b) Write the non-recursive algorithm for matrix multiplication and explain.

12. (a) Describe Strassen's matrix multiplication and write a pseudo code for obtaining the product of two matrices.

Or

(b) Analyze and calculate the efficiency of Dijkstra's algorithm in two different representations.

13. (a) Explain how to restructure the innermost loop of the Warshall's algorithm to make it run faster at least on some inputs.

Or

(b) Write an algorithm to implement the memory function method for the knapsack problem.

14. (a) Explain how to find a Hamiltonian circuit in a graph with example.

Or

(b) Describe the branch-and-bound approach to solve an assignment problem with illustration.

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15. (a) Analyze the time efficiency of the discrete and continuous Knapsack problems.

Or

(b) Explain the greedy algorithm based on nearest-neighbor heuristic to solve the travelling salesman problem.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Define and Analyze the Time efficiency of Towers of Hanoi Puzzle.

17. Outline and Analyze the time efficiency of the Kruskal's Algorithm with an example.

18. Describe Floyd's algorithm for the all-pairs shortest-paths problem with an application to a specific graph.

19. Design and implement a backtracking algorithm for the Puzzle-pegs game problem defined below:

Game is played on a triangular board with 15 small holes arranged in an equilateral triangle. In the initial stage, all but one of the holes are occupied by pegs. The goal is to remove all pegs but one by jumping pegs from its immediate neighbor into an empty square opposite and the jump removes the jumped-over neighbor from the board.

20. Explain the greedy algorithm based on Multifragment-heuristic to solve the travelling salesman problem.

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M.Sc. DEGREE EXAMINATION, APRIL 2024

First Semester

Computer Science

OBJECT ORIENTED ANALYSIS AND DESIGN

(CBCS – 2023 & 2024 onwards)

Time : 3 Hours　　　　　　　　　Maximum : 75 Marks

Part A　　　　　　　　　(10 × 2 = 20)

Answer **all** questions.

1. What is overriding feature? Why do you override a feature?

2. How is aggregation different from Association and generalisation?

3. What is the purpose of state diagrams in OMT models?

4. How are actions described in data flow diagrams?

5. How do the top down and bottom up approach work in adding inheritance?

6. What tools are used in functional modeling during Analysis phase?

7. What is the purpose of system design?

8. What is meant by continuous transformation?

9. What is Information Hiding?

10. How does delegation work?

Part B (5 × 5 = 25)

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

11. (a) A directory file contains information about files in a directory, including both ordinary files and directory files.

   (i) Prepare an object diagram which models directory files and ordinary files.

   (ii) Which attribute you will use as a qualifier.

   Or

   (b) Prepare an object model to describe undirected graphs. Your model should capture only the structure of a graph (ie connectivity).

12. (a) Prepare a data flow diagram for computing the volume and surface area of a cylinder. Inputs are the height and radius of the cylinder. Outputs are volume and surface area. Discuss any two ways of implementing the data flow diagram.

   Or

   (b) Prepare a data flow for computing the mean of a sequence of input values. A separate control input is provided to rest the computation. Each time a new value is input, the mean of all values input since the last reset command should be output. Detail your diagram down to the level of multiplication, division and additions.

13. (a) Elaborate preparing a scenario for an ATM. Write any three scenarios for Normal and exceptions in an ATM.

   Or

   (b) Discuss the criteria for keeping the right classes using an ATM example.

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14. (a) What kinds of data should be placed in database and in files.

Or

(b) Elaborate the different ways of decomposing a system into subsystems.

15. (a) Explain the process of choosing algorithms and data structures.

Or

(b) Elaborate the step of combining the models into physical organization of a program.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. What is meant by constraints in 0.0 models. Discuss any four different constraints with examples.

17. Discuss briefly the working of a programmable thermostat and draw state diagram for thermostat user interface.

18. What are the steps performed in constructing a function model during analysis phase.

19. Elaborate the different ways to implement control in software.

20. What is meant by Association? How are they designed?

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M.Sc. DEGREE EXAMINATION, APRIL 2024

First Semester

Computer Science

PYTHON PROGRAMMING

(CBCS – 2023 onwards)

Time : 3 Hours   Maximum : 75 Marks

Part A   (10 × 2 = 20)

Answer **all** the questions.

1.   Write the features of an algorithm.

2.   List the data types in Python.

3.   What is cipher text?

4.   Write the syntax for function definition.

5.   Write the syntax for class definition and constructor.

6.   What are the components of window?

7.   What is Django?

8.   Which package is preferred for installing Django?

9.   What is Django view?

10. Name the databases which are compatible to Django object relational mapper.

Part B (5 × 5 = 25)

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

11. (a) Prepare a Python code to count the number of space character in a string using loop statement.

Or

(b) Explain selection statements with suitable example.

12. (a) Prepare a Python code to accept a string and use a loop to print the character of strings in reverse order.

Or

(b) Illustrate the operations on List.

13. (a) Show the importance of Grid class.

Or

(b) Prepare a Python code to illustrate GUI based application of your own.

14. (a) Discuss about the basic structure of creating an application in Django.

Or

(b) Explain the fields In Post model.

15. (a) Illustrate the methods used to retrieve object from the database.

Or

(b) Prepare a view to display the list of posts.

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Answer any **three** questions.

16. Analyze different forms of loop statement with example.

17. Summarize the string methods with example.

18. Explain how to add command button to a window and how to respond to user events. Give suitable example.

19. Assess the method of project creation in Django.

20. Elaborate about creating templates for views.

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M.Sc. DEGREE EXAMINATION, APRIL 2024

First Semester

Computer Science

Elective – ADVANCED SOFTWARE ENGINEERING

(CBCS – 2023 onwards)

Time : 3 Hours   Maximum : 75 Marks

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

Answer **all** questions.

1. State the software quality attributes.

2. What is meant by Iron Triangle?

3. List the commonly used operational semantics of a formal method.

4. Specify the pre- and post-conditions of a function that takes a real number as argument and returns half the input value if the input is less than or equal to 100 or else returns double the value.

5. What is UMP?

6. Using the data of the following table, what is the total project duration?

Activity	Duration	Predecessors
A	14	–
B	13	A
C	20	A
D	10	B, C

7. State the different types of coupling in the increasing order of their severities.

8. What ale the important differences between the function-oriented and object-oriented design?

9. Define Software Reverse Engineering.

10. Mention the metrics used to measure software reliability.

Part B (5 × 5 = 25)

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

11. (a) Explain briefly about the Phased Development Process and Managing the Process.

Or

(b) Elaborate on Configuration Management Functionality and its Mechanisms.

12. (a) Describe in detail about the merits and limitations of Formal System Specification.

Or

(b) Explain how to document the functional require elements for the following:

(i) Withdraw cash from ATM

(ii) Search Book Availability from Library.

13. (a) How to identify various types of risks and explain the approaches for risk management?

Or

(b) Examine the principal responsibilities of a software project manager and the skills necessary to accomplish those responsibilities.

2 | **S–3210**

14. (a) Describe the IEEE recommended practice for software design descriptions.

Or

(b) What are the outcomes of a design process? Explain.

15. (a) Elaborate on Testing tools in detail.

Or

(b) Explain software process maintenance models in detail.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Describe in detail about the Software Development Process Models.

17. Explain the need for SRS with proper examples.

18. How Function Point (FP) metric overcomes the shortcomings of Lines of Code (LOC) metric with proper illustration.

19. Describe in detail about Cohesion and Coupling.

20. Explain the techniques used in functional testing in detail.

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M.Sc. DEGREE EXAMINATION, APRIL 2024.

First Semester

Computer Science

Elective – EMBEDDED SYSTEMS

(CBCS – 2023 onwards)

Time : 3 Hours   Maximum : 75 Marks

Part A   (10 × 2 = 20)

Answer **all** the questions.

1. Write any two specific features of 8051 micro controller.

2. When TF0 or TE1 is set to 1?

3. Write the addressing modes used to access data.

4. List any four increment and decrement mnemonics.

5. State the role of scheduler.

6. List the features of pipes.

7. What is a soft real-time system?

8. Expand ADSP.

9. What is cross-compiler?

10. State the functions of Logic Analyzer.

Part B (5 × 5 = 25)

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

11. (a) Outline the functionality of each port.

Or

(b) Discuss about external memory.

12. (a) Illustrate Bit Jump Instruction.

Or

(b) Explain A/D conversion.

13. (a) Illustrate execution flow with semaphore.

Or

(b) Describe mail boxes.

14. (a) Summarize the advantage and disadvantages of using a large number of tasks.

Or

(b) Describe different methods of saving memory space in embedded systems.

15. (a) Discuss the tool chain for building embedded software.

Or

(b) Discuss the basic method of testing embedded software on the development host.

2 S–3211

Answer any **three** questions.

16. Explain 8051 micro controller Pin diagram and its functions.

17. Illustrate byte level logic operations with example.

18. Elaborate in details about the Interrupt routine in RTOS environment.

19. Discuss about the encapsulating queues.

20. Explain Host and Target Machines.

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M.Sc. DEGREE EXAMINATION, APRIL 2024

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** questions.

1.   What is meant by data pre processing?

2.   What is meant by inconsistent and incomplete data?

3.   Expand the terms OLAP and OLAM.

4.   What is data mart?

5.   Define the term prediction.

6.   What do you mean by classification?

7.   What do you mean by data clustering?

8.   What do you mean by the term outlier?

9.   What is spatial data?

10.   What is meant by text mining?

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

11. (a) Bring out the major issues in data mining.

Or

(b) Explain briefly about data reduction.

12. (a) Write short notes on multidimensional data.

Or

(b) Give a brief account on data partitioning methods.

13. (a) Explain about lazy learners.

Or

(b) Explain decision tree based induction.

14. (a) Explain hierarchical clustering.

Or

(b) What are the data types used in cluster analysis? Explain.

15. (a) Write short notes on web mining.

Or

(b) "Trends in Data Mining" – Discuss.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Describe in detail about the data mining tasks and process.

17. Describe the architecture of an example data warehouse.

18. Write and explain how apriori algorithm works.

19. Explain model based clustering methods.

20. Explain in detail about multimedia data mining.

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M.Sc. DEGREE EXAMINATION, APRIL 2024

Second Semester

Computer Science

PRINCIPLES OF COMPILER DESIGN

(CBCS – 2023 onwards)

Time : 3 Hours   Maximum : 75 Marks

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

Answer **all** questions.

1. Specify compiler writing tools.

2. Convert regular expression $(a|b)^* ab (a|b)^*$ to finite automata in compiler design.

3. Construct parse tree for $E-> E + E/E * E/id$.

4. List the Rules for LR parser.

5. Convert a + (b $*\ominus$ c) is in Postfix form.

6. Disadvantages of Syntax Directed Translation:

7. List the various types of control structures.

8. Name the Data Structures Used in Compiler.

9. Spell out the process of code optimization.

10. What is peephole optimization?

Part B (5 × 5 = 25)

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

11. (a) Explain book keeping in compiler construction.

Or

(b) Identify the role of lexical analyzer.

12. (a) Consider the grammar

S –> S + S

S –> S * S

S –> id

Perform Shift Reduce parsing for input string "id + id + id".

Or

(b) Construct SLR parsing table for the given context-free grammar .

S –> AA

A –> aA | b

13. (a) Write Implementation of syntax – directed translator.

Or

(b) Deal with the statements that alter the flow of control.

14. (a) Evaluate Run time storage administration.

Or

(b) Summarize Syntactic phase errors.

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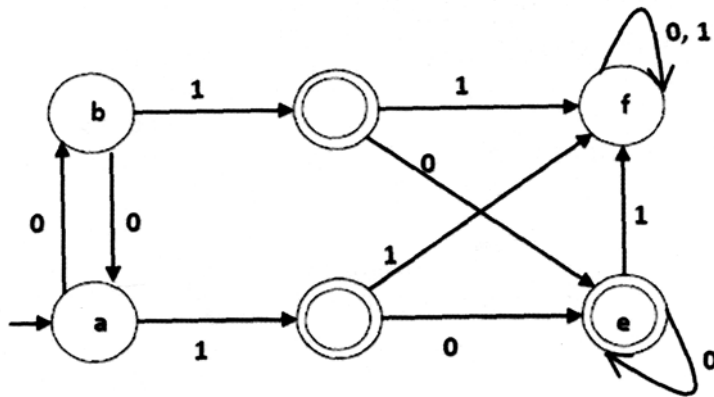
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15. (a) Induction Variable Elimination.

Or

(b) Discuss Register allocation and assignment.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Minimize the number of states of a given DFA.

17. Discuss Top-down parsing.

18. Write three address code for following code
for (i = 1; I < = 10; i++)
{
a[i]=x *5;
}

19. Implement linear list and binary tree in the symbol table
of a data structure.

20. Explain code optimization.

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S–3214	Sub. Code
	23MCE2C3

M.Sc. DEGREE EXAMINATION, APRIL 2024

Second Semester

Computer Science

ADVANCED JAVA PROGRAMMING

(CBCS – 2023 onwards)

Time : 3 Hours   Maximum : 75 Marks

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

Answer ALL the questions

1. What is a Java component?

2. What is a socket in Java networking?

3. What are the main components of RMI?

4. What is the role of the java.rmi.Naming Class?

5. Define: JDBC.

6. What is the purpose Class.forName method?

7. What is the difference between an Applet and a Servlet?

8. Define: Cookie.

9. What is the purpose of manifest files in JAR archives?

10. Difference between a Choice and a List.

Section B (5 × 5 = 25)

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

11. (a) Explain the purpose of the ActionEvent class in Java event handling.

    Or

    (b) How can you capture audio input in a Java application? Explain.

12. (a) What are the steps involved in developing an RMI application? Discuss.

    Or

    (b) Explain the role of stubs and skeletons in RMI.

13. (a) What are the steps involved in establishing a connection to a database using JDBC?

    Or

    (b) Differentiate between Statement and Prepared Statement in JDBC.

14. (a) Explain the lifecycle of a servlet.

    Or

    (b) Differentiate between scriptlets, expressions, and declarations in JSP.

15. (a) Explain the structure of a JAR file.

    Or

    (b) How do you create a JButton with an action listener in Java Swing?

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Section C (3 × 10 = 30)

Answer any **three** questions.

16. Compare and contrast the MouseListener and ActionListener interfaces in Java.

17. Explain how object serialization is used in RMI.

18. Discuss the advantages and disadvantages of using JDBC for database access in Java applications.

19. How can you handle form data in servlets? Explain.

20. Explain the concept of executable JAR files and how they are created.

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M.Sc. DEGREE EXAMINATION, APRIL 2024.

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.   Define Artificial Intelligence (AI).

2.   List out various problems.

3.   What do you mean by mean end analysis?

4.   Recall frame problem.

5.   Define logic.

6.   Differentiate procedural and declarative knowledge.

7.   Give the characteristics of bigdata.

8.   What is data mining?

9.   Define Data Preparation.

10. List any four ML Applications.

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

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

11. (a) Explain the AI Problems and its Components.

       Or

    (b) How to define a problem as state space search? Discuss it with the help of an example.

12. (a) Illustrate the heuristic Hill Climbing Algorithm with an example.

       Or

    (b) Explain the issues in Knowledge Representation.

13. (a) Explain the resolution procedure in detail.

       Or

    (b) Explain briefly the difference between procedural and declaration knowledge.

14. (a) Discuss the importance of hybrid cloud.

       Or

    (b) Illustrate statistical theory how it is performed in machine learning.

15. (a) Point out applications of machine learning.

       Or

    (b) Discuss the data preprocessing in Machine Learning.

S–3215

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

Answer any **three** questions.

16. Explain Artificial Intelligence (AI) techniques in detail.

17. Discuss various approaches and issues in knowledge representation. Also discuss various Problems in representing knowledge.

18. Illustrate the use of predicate logic to represent the knowledge with suitable example.

19. Describe the approaches to machine learning.

20. Explain the Machine Learning Cycle in detail.

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S–3216	Sub. Code
	23MCE2E2

M.Sc. DEGREE EXAMINATION, APRIL 2024.

Second Semester

Computer Science

Elective – BLOCK CHAIN TECHNOLOGIES

(CBCS – 2023 onwards)

Time : 3 Hours　　　　　　　　　Maximum : 75 Marks

Part A　　　　　　　$(10 \times 2 = 20)$

Answer **all** questions.

1.   Brief the benefits of block chain.

2.   State the uses of crypto currencies.

3.   What is meant by mining mechanism?

4.   Define the term security.

5.   Mention the use of symmetric key cryptography.

6.   What is trust model in cryptography?

7.   List out the advantages of bitcoin.

8.   Brief the concept of crypto economics.

9.   What is machine to machine communication?

10.   Write short note on healthcare data.

Part B (5 × 5 = 25)

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

11. (a) Write short note on block chain platforms.

Or

(b) Brief the concept of chain of custody.

12. (a) Explain the merits of block chain 3.0.

Or

(b) What is called block chain network? Explain with illustrations.

13. (a) What is peer to peer trust model? Explain with illustrations.

Or

(b) Brief the concept of public key cryptography.

14. (a) Explain the concept of crypto currency regulation.

Or

(b) Discuss in detail about the exchange of crypto currency.

15. (a) Briefly explain the challenges of block chain.

Or

(b) Explain the concept of healthcare value.

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Part C (3 × 10 = 30)

Answer any **three** questions.

16. Discuss in detail about the distributed ledger technology.

17. Explain the various advancements and features of block chain.

18. Discuss in detail about the application of cryptography to block chain.

19. Describe the legal views of bitcoin.

20. Discuss the challenges for using block chain for healthcare data.

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