CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech III Semester Regular & Supplementary Examinations Feb/March -2023

Course Name: DISCRETE MATHEMATICS
(Common for CSE, IT, CSC & CSM)

Date: 20.02.2023 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.   10x2=20M

1.	Find the relation R on {1, 3, 5} is such that x R y if and only if y = x + 2.	2 M
2.	Find the power set of A = {1, 2, 3}.	2 M
3.	State pigeonhole principle.	2 M
4.	Find the number of ways of placing 10 similar balls in 6 number boxes.	2 M
5.	Define Tautology and Contradiction.	2 M
6.	Define free and bounded variables.	2 M
7.	Define semi group.	2 M
8.	In a Boolean algebra, show that $x + (x \cdot y) = x$.	2 M
9.	Define Hamiltonian cycle with example.	2 M
10.	State the Euler's Formula.	2 M

PART-B

Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). If R and S are transitive relations on a set A, then show that R ∩ S is transitive.   10M

OR

11. B). Find an equivalence relation on a set {1,2,3} corresponding to the partition {{1, 3},{2}}.   10M

12. A). Explain power set theorem with example.   10M

OR

12. B). In how many ways can the letters {5a, 4b, 3c} be arranged so that all the letters of the same kind are not in a single block.   10M

13. A). Show that the implication $(p \rightarrow q) \rightarrow q \Rightarrow p \vee q$ using rules of inference.   10M

OR

13. B). i) Define Existential and Universal quantifiers with examples.   4M
ii) List and explain different types of proof techniques with example.   6M

14. A). Express the function $(x \wedge y) V (\sim x \wedge \sim y)$ into conjunctive normal form.   10M

OR

14. B). Show that {1, -1, i, - i} is an abelian group with respect to multiplication operation.   10M

(P.T.O..)

15. A). State and prove fundamental theorem of graph theory.   10M

OR

15. B). i) Show that a complete graph K_n is planar if and only if $n \leq 4$.   4M

ii) Take any two graphs and check whether those graphs are isomorphic to each other or   6M
not? Justify your answer.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023
Course Name: DESIGN & ANALYSIS OF ALGORITHMS
(Common for CSC & CSD)

Date: 22.02.2023 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1. Define the terms: i) Profiling ii) Space Complexity.   2 M
2. What are the Characteristics of an Algorithm?   2 M
3. What is the constraint and objective function of knapsack problem?   2 M
4. Distinguish dynamic programming and Divide and Conquer.   2 M
5. Define Bounding Function.   2 M
6. What is Chromatic number and give the state space tree for 4 – coloring problem?   2 M
7. Define spanning tree.   2 M
8. State Pre-ordered traversal of a tree.   2 M
9. Define Cook's Theorem.   2 M
10. Define Exponential Time.   2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). i) What is Time complexity of an algorithm?How to estimate time complexity using   5M
frequency count method.

ii) Solve the following recurrence relation: 5M

$$T(n) = \begin{cases} a, & if\ n = 1 \\ 2T\left(\dfrac{n}{2}\right) + C_n\ if\ n > 1\ where\ a\ and\ c\ are\ constants. \end{cases}$$

OR

11. B). Write the algorithm for matrix multiplication and find the time complexity of the   10M
algorithm using step–count method.

12. A). i) Explain the structure of Divide and Conquer algorithms.   3M
ii) Write and explain starassen's Matrix Multiplication algorithm.   7M

OR

12. B). i) Describe an algorithm for optimal solution of TSP using dynamic programming.   5M
ii) Solve the following job sequencing problem: 5M
n=5, (p1, ...,p5)=(30, 45, 20, 15, 10) and (d1, ..., d5)=(2,2,1,3,3).

13. A). i) Outline N-Queens problem and solve 8-Queens problem using backtracking.   5M
ii) What is a Hamiltonian Cycle? Explain how to find Hamiltonian path and cycle using   5M
backtracking algorithm?

(P.T.O..)

OR

13. B). Explain the FIFO BB 0/1 Knapsack problem procedure with the knapsack instance for   10M
n=4, m=15, (p1,p2,p3,p4)=(10,10,12,18), (w1,w2,w3,w4) =(2, 4, 6, 9). Draw the portion
of the state space tree and find optimal solution.

14. A). Find the minimum cost spanning tree for the given problem step by step using prim's   10M
Algorithms.
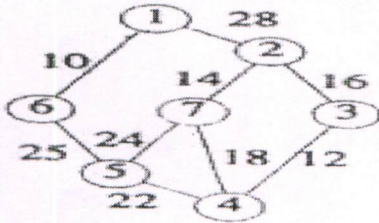
OR

14. B). Explain the traversal of a graph using DFS and BFS.

10M

15. A). i) Explain NP-complete and NP-Hard classes and differentiate between them with suitable   5M
examples.

ii) Explain the satisfiability problem and write the algorithm for the same.

5M

OR

15. B). i) Explain NP –hard and NP-complete classes with examples.

5M

ii) Explain about min-max search problem.

5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023
Course Name: COMPUTER ORGANIZATION & ARCHITECTURE
(Common for CSE, IT, CSC, CSM, AID & AIM)

Date: 24.02.2023 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	How Digital modules are built?	2 M
2.	Define instruction set.	2 M
3.	What is purpose of carry save multiplier?	2 M
4.	Mention the purpose of ripple carry adder.	2 M
5.	What are the differences between synchronous and Asynchronous transfer?	2 M
6.	What is an interrupt?	2 M
7.	What is the difference between super pipeline, super scalar pipeline.	2 M
8.	What is cache coherency?	2 M
9.	What is the significance of initializing cache? How is it done?	2 M
10.	Define address space and memory space.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).   What is an instruction? With example explain three, two, one, zero address instructions.   10M

OR

11. B).   i) Explain about General register organization with seven registers   5M
ii) Describe the Addressing Modes: a) Direct, b) Relative and c) Register with example.   5M

12. A).   i) Dividend A=01110 Divisor B=10001. Explain and perform division restoring algorithm with flowchart.   5M
ii) Explain the Booth's algorithm for multiplication of signed two's complement numbers.   5M

OR

12. B).   i) Distinguish between fixed point representation and floating point representation.   5M
ii) Perform the (+21)+(-16) and (-23)+(+13) arithmetic operations using 2's complement representation for negative numbers.   5M

13. A).   Explain the following modes of transfer in brief   10M
(i)   Interrupt initiated I/O
(ii)   DMA

OR

13. B).   i) Distinguish Hardwired control Vs Micro programmed control.   5M
ii) Write short note on Interrupt driven I/O.   5M

(P.T.O..)

14. A). Write in brief about   10M
      (i)   Pipeling
      (ii)   Comparison between RISC and CISC

OR

14. B). i) Mention the categories of multiprocessors? List the major MIMD Styles.   5M
       ii) Discuss about Array Processors.   5M

15. A). i) Why page-table is required in a virtual memory system? Explain different ways of   5M
       organizing a page table.
       ii) What do you mean by memory hierarchy? Describe in detail.   5M

OR

15. B). What is a page fault? What does a page fault signify? Explain the different page   10M
       replacement algorithms which determine the page to be removed in case of full memory.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023
Course Name: OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(Common for CSC, CSM, AID & AIM)

Date: 27.02.2023 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1. List any four features of java.   2 M
2. What is classpath variable?   2 M
3. Name the keywords used in Exception Handling.   2 M
4. List the uses of Inner classes.   2 M
5. Define multithreading.   2 M
6. Classify the types of streams.   2 M
7. List the steps to connect database using JDBC.   2 M
8. What are Generics and its uses?   2 M
9. What is AWT?   2 M
10. Define JApplet.   2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).	What is Inheritance? Explain Method Overriding with suitable example.	10M

OR

11. B).	Define package. Explain the procedure for creating and accessing a package with an example.	10M

12. A).	Develop a java program to read input from the user. If the input is –ve number then program should raise a user defined exception.	10M

OR

12. B).	What are the different types of a Inner classes? Explain Anonymous Inner Class with an example.	10M

13. A).	Explain wait(), notify() and notifyAll() methods for thread communication with example.	10M

OR

13. B).	i) Develop a java program to count number of words, lines and characters in a given file.	5M
	ii) Develop a java program to create thread using Thread class.	5M

14. A).	Explain JDBC driver types in detail.	10M

OR

14. B).	Explain ArrayList and HashTable with suitable example.	10M

15. A).	i) List Event Classes and Event Listeners.	5M
	ii) Explain various mouse events.	5M

OR

15. B).	Develop a java program to handle mouse events.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023
Course Name: DATABASE MANAGEMENT SYSTEMS
(Common for CSE, IT, CSC, CSD & AID)

Date: 01.03.2023 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   **10x2=20M**

1.	How to represent the strong entity set and weak entity set in E-R Model?	2 M
2.	What are the limitations and goals of DBMS?	2 M
3.	Define the terms: Relational Databases, Tables	2 M
4.	Explain Integrity constraints over relations.	2 M
5.	What do you mean by Normalization and note it's needy?	2 M
6.	Define Fifth Normal Form.	2 M
7.	What is Multiple Granularity?	2 M
8.	What do you mean by Locking protocol?	2 M
9.	Differentiate Indexing and Hashing.	2 M
10.	Discuss about Primary Indexes.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A).	i) Explain Conceptual design with E-R model.	5M
	ii) Explain in detail about DDL and DML with an example.	5M

OR

11. B).	List the Merits and Demerits of E-R model? Draw an E-R Diagram for any Banking Enterprise System.	10M

12. A).	Explain the following Operators in SQL with examples: i) SOME, ii) IN, iii) EXCEPT, iv) EXISTS and v) UNION.	10M

OR

12. B).	What are Integrity constraints? Define the terms Primary key constraints and Foreign key constraints. How are these expressed in SQL.	10M

13. A).	Explain in detail about 2NF, 3NF and BCNF with example.	10M

OR

13. B).	Explain Tuple Relational Calculus and Domain Relational Calculus with suitable examples.	10M

(P.T.O..)

14. A). i) Define Transaction? Explain ACID properties.   5M
         ii) Give an overview of Timestamp Based Protocol.   5M

OR

14. B). Explain the concept of Serializability and Recoverability with example.   10M

15. A). Explain Hash Based Indexing and Tree Based Indexing with example.   10M

OR

15. B). Explain in detail about Indexed Sequential Access Methods.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023

Course Name: PYTHON PROGRAMMING

(Common for CE, EEE, ME, ECE, CSE, IT, CSC & CSM)

Date: 03.03.2023 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.   10x2=20M

1.	Mention any two features of Python.	2 M
2.	What is implicit conversion? Give an example.	2 M
3.	Python strings are immutable. Justify.	2 M
4.	Do Loop statements have else clause? When will it be executed?	2 M
5.	How will you update list items? Give one example.	2 M
6.	What is difference between list and tuple in python?	2 M
7.	Explain what a constructor does.	2 M
8.	How is the lifetime of an object determined? What happens to an object when it dies?	2 M
9.	Explain what happens when a program receives a non-numeric string when a number is expected as input.	2 M
10.	When would you make a data field read-only, and how would you do this?	2 M

PART-B

Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).   Write Python Program to reverse a number and also find the Sum of digits in the reversed   10M
number. Prompt the user for input.

OR

11. B).   Explain the basic data types available in Python with examples.   10M

12. A).   Write a function to determine whether a given natural number is a perfect number. A   10M
natural number is said to be a perfect number if it is the sum of its divisors.

OR

12. B).   List the three types of conditional statements and explain them.   10M

13. A).   Write a Python program to add 'ing' at the end of a given string (length should be at   10M
least 3). If the given string already ends with 'ing' then add 'ly'. instead. If the string
length of the given string is less than 3, leave it unchanged.

OR

13. B).   Compare and contrast different functions and methods used in dictionaries and set.   10M

(P.T.O..)

14. A).   i) Write a short notes on different built in attributes associated with a class.   5M
          ii) With the help of examples explain the concept of class methods and static methods.   5M

OR

14. B).   Write a program that uses datetime module within a class. Enter manufacturing date and   10M
          expiry date of the product. The program must display the years, months, and days that are
          left for expiry.

15. A).   Write a line of code that adds a Float Field to a window, at position (1, 1) in the grid, with   10M
          an initial value of 0.0, a width of 15, and a precision of 2.

OR

15. B).   Describe the Graphical user interface using the tkinter module and widgets.   10M

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