CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations February-2024
Course Name: DISCRETE MATHEMATICS
(Common for CSE, IT, CSC, CSM, CSD, AID & AIM)

Date: 05.02.2024 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.	Draw the hasse diagram for the poset (P(x), $\leq$) where x={1,2,3,4} and $\leq$ ={(x,y)/ x is subset to y}	2 M
2.	How do you prove Schroeder Bernstein Theorem?	2 M
3.	State the pigeonhole principle.	2 M
4.	Given the polynomial p(x) = x^2 + x +5 and g(x) = x +2. Find the value of q(x) and r(x).	2 M
5.	Show that p$\rightarrow$q $\equiv$ ~p$\lor$q using truth table.	2 M
6.	Write the existential quantifier in terms of universal quantifier.	2 M
7.	What is permutation group? Give an example.	2 M
8.	Differentiate disjunctive and conjunctive Normal forms.	2 M
9.	What is Hamiltonian Graph?	2 M
10.	What is meant by articulation point?	2 M

PART-B

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

11.A). Define an equivalence relation and show that the relation R defined as aRb iff 4 divides (a-b) over set of integers is an equivalence relation.   10M

OR

11. B). Show that (D_{30}, R), where a R b If and only if a divides b, is a complemented lattice. D_{30} is set of positive divisors of 30.   10M

12. A). Explain the Euclidian algorithm with an example.   10M

OR

12. B). Suppose that the license plates of certain state require 3 English letters followed by 4 digits: 10M
a) How many different plates can be manufactured if repetition of letters and digits allowed.
b) How many plates are possible if only letters can be repeated.
c) How many are possible if no repetitions are allowed at all.

13. A). By using logic equivalence prove or disprove $\left(\sim p(p \lor q)\right) \rightarrow q \equiv T$.   10M

OR

13. B). Obtain the principal disjunctive normal form of $(P \land Q) \lor (\sim P \land R) \lor (Q \land R)$.   10M

(P.T.O..)

14. A). What is a group show that addition modulo 5 is a group?   10M

OR

14. B). List out the identities of Boolean algebra.   10M

15. A). Show that K_5 is non-planar.   10M

OR

15. B). Define isomorphism of graph. Justify that the graph $K_{2,3}$ Is a planar graph.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations February-2024
Course Name: DESIGN & ANALYSIS OF ALGORITHMS
(Common for CSC & CSD)

Date: 07.02.2024 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

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1.	Define omega notation.	2 M
2.	Define Time Complexity and space complexity.	2 M
3.	What is the time complexity of Strassen's matrix multiplication?	2 M
4.	What is knapsack problem?	2 M
5.	Define dynamic programming.	2 M
6.	What is graph coloring?	2 M
7.	Define topological sorting.	2 M
8.	How to compute transitive closure?	2 M
9.	Define non deterministic algorithms.	2 M
10.	Define lower bounds through reduction.	2 M

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

11.A).	Explain the characteristics of an algorithm with suitable example.	10M

OR

11. B).	i) Explain about asymptotic notations in detail.	5M
	ii) Evaluate the Big-Oh Notation, Little-Oh Notation and Theta notation for $f(n)=2n^2+10n+100$	5M

12. A).	Show that Merge sort is implemented by Divide and conquer method.	10M

OR

12. B).	Construct Optimal Binary Search Tree(OBST) for the following elements n=4, (a_1,a_2,a_3,a_4)=(do, if, int, while), (p_1,p_2,p_3,p_4)=(3,3,1,1) and (q_0,q_1,q_2,q_3,q_4)=(2,3,1,1,1)	10M

13. A).	Explain Travelling Salesman problem with Branch and Bound method.	10M

OR

13. B).	Apply sum of subsets problem with W={5,7,10, 12,15,18,20} and M=35 and also draw the portion of the state space that is generated.	10M

(P.T.O..)

14. A). Obtain all pair shortest path for the following graph. 10M
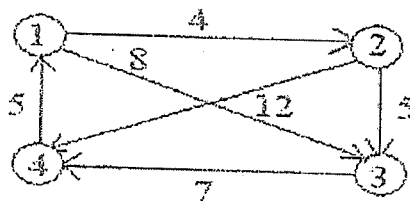
OR

14. B). What is minimum cost spanning tree? Explain Kruskal's method with an example. 10M

15. A). What is meant by computability of Algorithms? What are different computable classes? Explain. 10M

OR

15. B). Write short notes on disjoint set problem in lower bounds through reduction. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations February-2024
Course Name: COMPUTER ORGANIZATION & ARCHITECTURE
(Common for CSE, IT, CSC, CSM, AID & AIM)

Date: 09.02.2024 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 computer organization of a digital computer.	2 M
2.	Write Basic symbols for register transfer.	2 M
3.	Differentiate between restoring and non-restoring division algorithm.	2 M
4.	Represent the number $(+37.8)_{10}$ as a floating point binary number with normalized fraction mantissa 16 bits and exponent 8 bits.	2 M
5.	What is the need of I/O interface?	2 M
6.	Why does DMA have priority over the CPU when both request a memory transfer?	2 M
7.	Define pipelining.	2 M
8.	List the pipeline hazards.	2 M
9.	What is cache memory?	2 M
10.	What is meant by memory interleaving?	2 M

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

11.A).   i) Explain about Bus and Memory Transfer.   5M
         ii) Explain about Computer instructions.   5M

OR

11. B).   i) Describe Instruction cycle in computer system.   5M
         ii) A Computer uses a memory unit with 256 K words of 32 bits each. A binary   5M
         instruction code is stored in one word of memory. The instruction has four parts: an
         indirect bit, an operation code, a register code part to specify one of 64 registers, and an
         address
         part.
         (a) How many bits are there in the operation code, the
         register code part, and the address part?
         (b) Draw the instruction word format and indicate the
         number of bits in each part.
         (c) How many bits are there in the data and address inputs of the memory?

12. A).   i) Explain the process of floating point number multiplication with flow chart.   5M
         ii) Show the hardware for a 2 bit-by-2 bit array multiplier and explain its working.   5M

OR

12. B).   i) Using booth's multiplication algorithm, multiply the 3 X -4, show all the steps.   7M
         ii) What is the principle of carry look-ahead adder?   3M

(P.T.O..)

13. A). With a neat block diagram, explain the architecture of 8086 Microprocessor.   10M

OR

13. B). i) What is interrupt? Why priority of interrupt is required? How it is restored?   5M

ii) Give the comparison between programmed I/O and interrupt driven I/O.   5M

14. A). Name the two pipeline organizations. Explain about the arithmetic pipeline with the help of an example.   10M

OR

14. B). Explain instruction pipeline with neat timing diagram.   10M

15. A). Draw and explain fully associative cache organization.   10M

OR

15. B). Explain various page replacement algorithms.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations February-2024
Course Name: OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(Common for CSC, CSM, AID & AIM)

Date: 12.02.2024 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 basic characteristics of OOP.	2 M
2.	Define package? Write syntax to create a package.	2 M
3.	What is an Inner class?	2 M
4.	What are the benefits of Exception Handling?	2 M
5.	List out the states of Thread.	2 M
6.	What is the use of PrintStream class?	2 M
7.	What is JDBC?	2 M
8.	What is the use of enum keyword.	2 M
9.	Define the scala.	2 M
10.	Differentiate between the Event sources and Event Listeners.	2 M

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

11.A). What is polymorphism? Explain how polymorphism is implemented in java with suitable example.   10M

OR

11. B). Define Interface? Illustrate the implementation of interface with example.   10M

12. A). Define Exception? Create a java program using try, catch and finally blocks.   10M

OR

12. B). Distinguish static Inner Class and Local Inner class with examples.   10M

13. A). Explain the different ways of creating Threads with example.   10M

OR

13. B). i) Classify the stream classes in java?   5M
ii) Develop a java program to read input from the user using Scanner class?   5M

14. A). i) Outline significance of collection interface.   5M
ii) List and explain the various methods defined in collection interface.   5M

OR

14. B). Explain the steps involved in building JDBC application.   10M

15. A). What is a Layout manager? Explain the different types of Layout manager.   10M

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 Supplementary Examinations February-2024
Course Name: DATABASE MANAGEMENT SYSTEMS
(Common for CSE, IT, CSC, CSD & AID)

Date: 14.02.2024 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.	What is DBMS? What are the advantages of DBMS.	2 M
2.	How to represent the strong entity set and weak entity set in ER-Model?	2 M
3.	Define the terms: Relational Databases, Tables.	2 M
4.	Define the form of basic SQL query.	2 M
5.	List the primitive operators in Relational algebra.	2 M
6.	What is schema refinement.	2 M
7.	Define Serializability.	2 M
8.	What is the motivation for concurrent execution?	2 M
9.	What is an index? Give an example.	2 M
10.	Define un clustered index.	2 M

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

11.A). Explain conceptual design with E-R model and Draw an E-R Diagram that illustrates the Banking System.   10M

OR

11. B). Explain the architecture of DBMS with a neat diagram and note its scope.   10M

12. A). What is a relation? Differentiate between a relation schema and relation instance? What are domain constraints, Discuss.   10M

OR

12. B). Illustrate the Set comparison operators and Aggregation operators with example.   10M

13. A). i) Discuss in detail about the operations of relation algebra with example.   5M
ii) Compare Super key, Candidate key, Primary Key for a relation with example.   5M

OR

13. B). What is redundancy? Explain the problems caused by redundancy with suitable example.   10M

14. A). i)What is Transaction? Explain the properties of Transaction.   5M
ii) Give an overview of Validation Based Protocol.   5M

OR

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

15. A). State and explain various file organization methods. Give suitable examples to each of them.   10M

OR

15. B). Explain about indexed sequential access methods in detail.   10M

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