

H.T No: 

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**R18**

Course Code: A30506



**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  $R \cap S$  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  $(x \wedge y) \vee (\sim x \wedge \sim y)$  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 not? Justify your answer.

6M

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Course Code: A30461



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023  
Course Name: ANALOG & DIGITAL ELECTRONICS

(Common for CSE & IT)

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. Draw the Diode Equivalent Circuits.                                                                              | 2 M |
| 2. What are the applications of Zener diode.                                                                        | 2 M |
| 3. Compare Common Base, Common Emitter and Common Collector Amplifier Configurations in terms of AV, AI, Ri and RO. | 2 M |
| 4. Classify the types of transistors with its symbols.                                                              | 2 M |
| 5. Sketch the basic construction of a p-channel JFET.                                                               | 2 M |
| 6. Solve the following                                                                                              | 2 M |
| i) Convert (101011) <sub>2</sub> into Gray code.                                                                    |     |
| ii) Convert the Gray code (101101) into a binary number.                                                            |     |
| 7. Draw the logic circuit for single-bit magnitude comparator.                                                      | 2 M |
| 8. Implement the Boolean function $F = AB + CDE + F$ using NAND gates only.                                         | 2 M |
| 9. Compare the combinatorial circuits over sequential circuits?                                                     | 2 M |
| 10. Write excitation table for JK flip-flop.                                                                        | 2 M |

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the operation of P-N junction diode under forward and reverse bias with necessary diagrams. 10M

**OR**

11. B). Draw the circuit diagram of Full wave rectifier? Explain the operation of circuit with relevant waveforms. 10M

12. A). Sketch the common emitter configuration circuit and explain the Input and output characteristics with neat diagrams. 10M

**OR**

12. B). Explain the construction, principle of operation, characteristics and applications of UJT. 10M

13. A). Draw and Explain about the Operation of N-Channel Field Effect Transistor. 10M

**OR**

13. B). i) Evaluate signed 10s complement form and perform the following operations:  $(9286) + (-801)$ . 4M

- ii) Generate the 12 bit Hamming code, for given the 8-bit data word 10101111 that detects & corrects single bit error if any. 6M

(P.T.O..)



14. A). Realize the Function  $F(A, B, C, D) = \pi M(0, 2, 3, 5, 6, 8, 10, 12, 14)$  using K-map and design logic diagram using Basic Gates. 10M

OR

14. B). Define Demultiplexer and explain the procedure to implement 16X1 Multiplexers by using 4X1 Multiplexers. 10M

15. A). i) Develop the Mealy machine state diagram from the given state table 7M

PS	NS,Z	
	X=0	X=1
A	C,0	B,0
B	A,1	D,0
C	B,1	A,1
D	D,1	C,0

ii) What are the capabilities and limitations of finite state machines? 3M

OR

15. B). Draw the circuit diagram of 4 bit ring counter using D flip-flops and explain its operation with the help of bit pattern. 10M

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Course Code: A30513



**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 organizing a page table. 5M  
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 replacement algorithms which determine the page to be removed in case of full memory. 10M

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**R18**

Course Code: A30507



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

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

**Course Name: OBJECT ORIENTED PROGRAMMING**  
(Common for CSE & IT)

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 the applications of OOP. 2 M
2. List the differences between Instance variables and Class (static) variables. 2 M
3. What is the need of finally block? 2 M
4. Difference between throw and throws. 2 M
5. What is thread synchronization? 2 M
6. Which is better Scanner or BufferedReader? 2 M
7. How to convert string to token in Java? 2 M
8. List the 4 types of JDBC drivers. 2 M
9. Differentiate between Label and TextField. 2 M
10. What are types of mouse events? 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain about creating and accessing a package with example. 10M
- OR**
11. B). Create a Complex number class in Java. The class should have a constructor and methods to add and subtract two complex numbers. 10M
12. A). Explain about Exception Handling in Java with examples. 10M
- OR**
12. B). Write a program to implement Java anonymous inner class with example using interface. 10M
13. A). Explain Inter-thread Communication in Java with a real time example. 10M
- OR**
13. B). Draw and explain I/O stream hierarchy in java. Write a Java program to reverse the contents of a file. 10M
14. A). How do you connect database through Java? In how many ways we can connect to database in Java? 10M
- OR**
14. B). What is the difference between Vector and ArrayList and Hash table in Java? Write a program to create a HashTable and implement atleast any two methods. 10M

(P.T.O..)



15. A). What are the 3 types of Java Swing components? Write a program to create each component. 10M

**OR**

15. B). How to handle mouse and keyboard events through Java program? Write a Java Program to Handle KeyBoard Event. 10M

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Course Code: A30509



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

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 need? 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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**R18**

Course Code: A30531



**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 number. Prompt the user for input. 10M

**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 natural number is said to be a perfect number if it is the sum of its divisors. 10M

**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 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. 10M

**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 expiry date of the product. The program must display the years, months, and days that are left for expiry. 10M

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

**OR**

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

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