CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	B.Tech III Semester Supplementary Examinations July-2025	
Course Name	:	Discrete Mathematics	
Course Code	:	A405306	
Branch	:	CSC	
Date & Session	:	01-07-2025 FN Duration: 3 hours	Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1.	Define the logical conjunction operator.	1 M
2.	Explain the normal form.	1 M
3.	Represent the set A = {1, 2, 3} using a Venn diagram.	1 M
4.	Define a binary relation with an example.	1 M
5.	What is Boolean algebra?	1 M
6.	Explain algebraic systems with examples.	1 M
7.	State the Binomial theorem.	1 M
8.	State the basic rules of counting.	1 M
9.	What is the spanning tree?	1 M
10.	Define the loop and parallel edges of the graph.	1 M

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

11.A).	Show that $(\sim p \wedge (\sim q \wedge r)) \vee (q \wedge r) \vee (p \wedge r) \Leftrightarrow r$	10M

OR

11. B).	Translate in the symbolic the "Socrates' argument"	10M

All men are mortal
Socrates is a man
Therefore, Socrates is a mortal.

12. A).	Given the sets A={1,2,3,4}A={1,2,3,4}, B={3,4,5,6}B={3,4,5,6},and C={5,6,7} C={5,6,7}, find:	10M

i) A∪B
ii) A∩B
iii) A−B
iv) B△C (symmetric difference)
v) A×{1,2}(Cartesian product)

OR

12. B).	Let A= {1,2,3. Define:	10M

i) A reflexive relation on A.
ii) A symmetric but not transitive relation on A.
iii) A partial order relation on A.
iv) An equivalence relation on A.

(P.T.O..)

13. A). Prove that every finite lattice is bounded. 10M

OR

13. B). Simplify the Boolean expression $(a \wedge b') \vee (a' \wedge b) \vee (a \wedge b)$ using axioms of Boolean Algebra. 10M

14. A). Using the principle of inclusion-exclusion, find the number of integers between 1 and 100 divisible by 2 or 3. 10M

OR

14. B). i) How many distinct anagrams can be formed from the word "COMBINATORICS"? 5M
ii) Derive the multinomial expansion for $(x+y+z)^3$. 5M

15. A). i) Prove that an undirected graph has an even number of vertices of odd degree. 5M
ii) Show that an undirected graph is a tree if and only if there is a unique simple path between any two of its vertices 5M

OR

15. B). Explain about Isomorphism of graphs with suitable examples. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech III Semester Supplementary Examinations July-2025
Course Name	:	Software Engineering
Course Code	:	A405308
Branch	:	CSE, CSM & AIM
Date & Session	:	01-07-2025 FN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1.	Define Software Myths	1 M
2.	Define Process.	1 M
3.	What is the purpose of feasibility study?	1 M
4.	What do you mean by requirement validation?	1 M
5.	List any two design concepts.	1 M
6.	What is the need to study architecture styles and patterns?	1 M
7.	What is alpha test?	1 M
8.	Define verification and validation.	1 M
9.	What is the purpose of SQA?	1 M
10.	List the types of Risks.	1 M

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

11.A).	Explain the different steps of Waterfall model with a diagram.	10M
	OR	
11. B).	Discuss Process Framework with a diagram.	10M
12. A).	Discuss the different requirements that are to be considered for developing a software.	10M
	OR	
12. B).	What is the purpose of SRS Document? List the table of contents of SRS Document.	10M
13. A).	What is the purpose of class diagram? Explain its components with an example.	10M
	OR	
13. B).	With an example illustrate sequence diagram.	10M
14. A).	Illustrate the different white box testing techniques with examples wherever required.	10M
	OR	
14. B).	Discuss the software testing strategies with a diagram.	10M
15. A).	What is FTR? Discuss the steps involved in FTR.	10M
	OR	
15. B).	What do you mean by RMMM? Explain about RMMM Plan.	10M

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H.T No: ☐☐☐☐☐☐☐☐☐☐ **R22**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech III Semester Supplementary Examinations July-2025
Course Name	:	Digital Electronics
Course Code	:	A404204
Branch	:	CSE, CSC & IT
Date & Session	:	03-07-2025 FN

Duration: 3 hours   Max. Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1.	Convert (6756)8 to decimal number system.	1 M
2.	State Duality theorem and give example.	1 M
3.	What is meant by don't care conditions?	1 M
4.	Define SOP and POS form'.	1 M
5.	Draw the diagram of full adder.	1 M
6.	Summarize the function of Multiplexer in digital circuits.	1 M
7.	Compare combinational and sequential circuits.	1 M
8.	Define Race Around Condition.	1 M
9.	Show the different types of ROM.	1 M
10.	What is meant by hazards in digital circuits?	1 M

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

11.A).	Explain the Binary codes with suitable examples.	10M
	OR	
11. B).	Subtract (101101)2 from (101001) using 1's and 2's complement method.	10M
12. A).	Simplify the Boolean expression using K-map and implement using Universal gates $F(A,B,C,D) = \Sigma m(1,2,3,8,9,10,11,14) +d(7,15)$	10M
	OR	
12. B).	Obtain the a) SOP b) POS expression for the given Boolean function $F(A,B,C,D)= \Sigma m(0,1,3,4,8,9,10, 12)$	10M
13. A).	Explain the design procedure of a 2-bit Magnitude Comparator.	10M
	OR	
13. B).	Elucidate 1-to-8 demultiplexer with suitable diagram.	10M
14. A).	Design a 4 bit synchronous counters using D-flip flop.	10M
	OR	
14. B).	Discuss in detail about shift registers with suitable diagrams.	10M
15. A).	Implement the following Boolean function using PAL $F1=A'B+BC+AB'C'$ $F2=(A+B'C)'$	10M
	OR	
15. B).	Discuss in detail about reduction of state and flow table with suitable examples.	10M

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H.T No: [ ][ ][ ][ ][ ][ ][ ][ ][ ]   **R22**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech III Semester Supplementary Examinations July-2025
Course Name	:	Computer Organization and Architecture
Course Code	:	A405307
Branch	:	CSM, CSD, AIM & AID
Date & Session	:	03-07-2025 FN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1.	Define the term Computer Architecture and Computer Organization.	1 M
2.	What are the types of Micro-Operations in RTL?	1 M
3.	What are advantages of Micro Programmed Control Units?	1 M
4.	What is Indirect Addressing Mode?	1 M
5.	Find 2's Complement of 00110010.	1 M
6.	What is Restoring method in Division Algorithm?	1 M
7.	What is Cycle Stealing in DMA?	1 M
8.	Define Hit Ratio in Cache Memory.	1 M
9.	Why is Pipelining easier in RISC?	1 M
10.	What is Cache Coherence?	1 M

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

11.A).	Draw and Explain the Block Diagram of a Digital Computer.	10M
	OR	
11. B).	Describe the Complete Instruction Cycle with a diagram.	10M
12. A).	Describe the Difference between Hardwired Control and Micro Programmed Control with Examples and Diagrams.	10M
	OR	
12. B).	Explain different types of Addressing Modes with Examples.	10M
13. A).	Explain IEEE Standard for Floating Point Representation. Represent the following Numbers in Single Precision and Double Precision Format. i) $(-1460.125)_{10}$ ii) $(65.175)_{10}$	10M
	OR	
13. B).	Using Booth's Algorithm to Perform Multiplication of $(-6) \times (3)$. Show all Steps and Intermediate Values along with Flowchart.	10M
14. A).	i) Differentiate Isolated I/O and Memory Mapped I/O.	5M
	ii) Explain the concept of Hand Shaking in Asynchronous Data Transfer with a Timing Diagram?	5M

(P.T.O..)

OR

14. B). i) What is Memory Hierarchy? Explain with a Diagram.   4M

ii) What is Cache Memory? Explain its Levels, Need and Working Principle in detail.   6M

15. A). i) Why did RISC Architectures become Popular? Discuss with Examples.   5M

ii) Explain Arithmetic Pipeline in detail with an Example.   5M

OR

15. B). i) What is Array Processing? How does it differ from Vector Processing?   6M

ii) Explain how Multiprocessor Systems improve Performance and Reliability.   4M

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H.T No: 　　　　　　　　　　 **R22**

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Examination	:	B.Tech III Semester Supplementary Examinations July-2025
Course Name	:	Electronic Devices and Circuits
Course Code	:	A404203
Branch	:	CSE, IT, CSC, CSM, CSD & AID
Date & Session	:	05-07-2025 FN　　　Duration: 3 hours　　　Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions
Each question carries ONE mark.　　　　　　　　　10x1=10M

1.	Show the V-I Characteristics of diode.	1 M
2.	List two types of capacitances in diodes.	1 M
3.	What is the ripple factor?	1 M
4.	Name the types of clamper circuits.	1 M
5.	State the function of a transistor.	1 M
6.	Name the terminals present in the Transistor.	1 M
7.	What does MOSFET stand for?	1 M
8.	List one advantage of MOSFETs over BJTs.	1 M
9.	What is the use of a Photo diode?	1 M
10.	List one application of Solar cell.	1 M

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

11.A).	i) Describe the equivalent circuit of a diode along with diffusion capacitance.	5M
	ii) Discuss about the various types of diode resistances.	5M

OR

11. B).	Explain the role of diodes as switches and discuss switching times.	10M

12. A).	Describe the working of a Bridge wave rectifier with a L- filter.	10M

OR

12. B).	Describe clippers and their function in electrical circuits.	10M

13. A).	Explain the principle and operation of BJT in common emitter configuration with neat sketches.	10M

OR

13. B).	Compare the different configurations of BJT and their applications.	10M

14. A).	List the types of JFET and Discuss how FET acts as a voltage variable resistor.	10M

OR

14. B).	Explain the construction and working principle of N-channel JFET along with its drain and transfer characteristics.	10M

15. A).	i) Explain the working principle of a tunnel diode.	5M
	ii) Compare avalanche and Zener diode breakdown.	5M

OR

15. B).	Explain the characteristics and working of a UJT.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech III Semester Supplementary Examinations July-2025
Course Name	:	Mathematical and Statistical Foundations
Course Code	:	A400003
Branch	:	CSM & AIM
Date & Session	:	08-07-2025 FN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1.	State the Division algorithm.	1 M
2.	Define congruence.	1 M
3.	Write the regression equation on X on Y.	1 M
4.	Define discrete random variable.	1 M
5.	Find the value of finite population correction factor for n=10 and N=1000.	1 M
6.	What is the range of F- distribution?	1 M
7.	Define type -II error.	1 M
8.	Define Null hypothesis.	1 M
9.	Define Dependent Stochastic process.	1 M
10.	Define Markov chain.	1 M

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

11.A). By using the Euclidean Algorithm find the G.C.D of 1769 & 2378 and also find x and y   10M
such that (1769, 2378) = 1769x + 2378y.

OR

11. B). State and prove Division Algorithm.   10M

12. A). Determine the equation of a straight line which best fits the data.   10M

X	10	12	13	12	16	15
Y	40	38	43	45	37	43

OR

12. B). A continuous random variable has the probability density function   10M

$$f(x) = \begin{cases} k\, x\, e^{-\lambda x} & , for\ x \geq 0, \lambda > 0 \\ 0 & , otherwise \end{cases}$$

Determine i) k   ii) mean and   iii) Variance

13. A). Two independent samples of 8 and 7 items respectively had the following vales.   10M

Sample I	11	11	13	11	15	9	12	14
Sample II	9	11	10	13	9	8	10	-

Is the difference between the means of samples significant?

(P.T.O..)

OR

13. B). A population consists of five numbers 2, 3, 6, 8 and 11. Consider all possible samples of   10M
size two which can be drawn with replacement from this population. Find
   i)   The mean of the population
   ii)   The standard deviation of the population
   iii)   The mean of the sampling distribution of means and
   iv)   The standard deviation of the sampling distribution of means.

14. A). Random sample of 400 men and 600 women were asked whether they would like to have   10M
a flyover near their residence. 200 men and 325 women were in favor of the proposal.
Test the hypothesis that the proportion of men and women in favor of flyover proposal are
same at 5% level of significance.

OR

14. B). The mean life of a sample of 10 electric bulbs was found to be 1456 hours with S.D. of   10M
423 hours. A second sample of 17 bulbs chosen from a different batch showed a mean life
of 1280 hours with SD. of 398 hours. Is there a significant difference between the means
of two batches?

15. A). In a cascade of binary communication channels, the symbols 1 and 0 are transmitted in   10M
successive stages. In any stage, the probability that a transmitted 1 is received as 1 is 0.75
and the probability that 0 is received as 0 is 0.5 ,
Find the probability that (i) 1 transmitted in the first stage is received correctly and (ii) 0
transmitted in the first stage is received as 1 after the third stage.

OR

15. B). The tpm of a Markov chain with three states 0,1,2 is   10M

$$P = \begin{bmatrix} 3/4 & 1/4 & 0 \\ 1/4 & 1/2 & 1/4 \\ 0 & 3/4 & 1/4 \end{bmatrix}$$ and the initial state distribution of the chain is

$P\{X_0 = i\} = 1/3$, i=0,1,2. Find (i) $P\{X_2 = 2\}$ and
(ii) $P\{X_3=1, X_2=2, X_1 = 1, X_0 = 2\}$

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech III Semester Supplementary Examinations July-2025
Course Name	:	Object Oriented Programming through Java
Course Code	:	A405303
Branch	:	CSE, CSC & CSD
Date & Session	:	08-07-2025 FN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries ONE mark.   **10x1=10M**

1.	List Java Buzz words.	1 M
2.	State the purpose of 'this' keyword.	1 M
3.	How interfaces differ with a class?	1 M
4.	Recall any 2 benefits of inheritance.	1 M
5.	What is the usage of finally block?	1 M
6.	Define thread and how to create a thread.	1 M
7.	Infer some limitations of AWT.	1 M
8.	Define canvas.	1 M
9.	What is an Event and Event source?	1 M
10.	What is the purpose of Adapter classes?	1 M

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

11.A).	Summarize the need and OOP concepts in brief.	10M
	OR	
11. B).	i) How to create classes and object? Illustrate with a program.	5M
	ii) Illustrate about constructors with a program.	5M
12. A).	i) How multiple inheritances are attained in Java? Elaborate with a suitable program.	5M
	ii) Demonstrate on Abstract classes with a suitable program.	5M
	OR	
12. B).	i) Assess the following keywords and its importance	5M
	a) super b) final	
	ii) Define a package? Discuss about creating and accessing a package.	5M
13. A).	i) How to throw user defined exceptions? Explain with a program	5M
	ii) Compare and contrast String with String Buffer classes	5M
	OR	
13. B).	i) Outline on Exception Handling and its benefits	5M
	ii) Explain multithreading concept using Runnable interface.	5M

(P.T.O..)

14. A). Explain the user interface components with an example program. 10M

OR

14. B). What are Layout Managers? Discuss about Border and Grid Layout manager with an example program. 10M

15. A). Build a program that should demonstrate various Key board events. 10M

OR

15. B). i) Distinguish between applets with an application. 5M
ii) Demonstrate on parameter passing mechanism to applets with a program. 5M

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H.T No: [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ] **R22**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech III Semester Supplementary Examinations July-2025
Course Name	:	Database Management Systems
Course Code	:	A405304
Branch	:	CSE, CSC & CSD
Date & Session	:	10-07-2025 FN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1.	Define data independence.	1 M
2.	Explain the three levels of abstraction in a DBMS.	1 M
3.	What is a relation in the relational model?	1 M
4.	Define primary key and foreign key.	1 M
5.	What is the structure of a basic SQL query?	1 M
6.	What is the purpose of UNION, INTERSECT, and EXCEPT operations?	1 M
7.	What is atomicity in transaction processing?	1 M
8.	What is serializability?	1 M
9.	What is the difference between primary and secondary indexes?	1 M
10.	Define cluster indexing.	1 M

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

11.A).	Explain the structure of a DBMS and its components.	10M
	OR	
11. B).	Describe conceptual design using the ER model.	10M
12. A).	Describe various integrity constraints and how they are enforced.	10M
	OR	
12. B).	Describe the process of logical database design.	10M
13. A).	Explain various SQL query constructs with examples.	10M
	OR	
13. B).	Differentiate between 3NF and BCNF with examples.	10M
14. A).	Explain the ACID properties of transactions with examples.	10M
	OR	
14. B).	Describe the various states of a transaction with a state diagram.	10M
15. A).	Describe the advantages and limitations of different indexing techniques.	10M
	OR	
15. B).	Discuss the structure and operations on B+ Trees.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech III Semester Supplementary Examinations July-2025
Course Name	:	Operating Systems
Course Code	:	A405305
Branch	:	CSM/ AIM
Date & Session	:	10-07-2025 FN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1.	What are operating system services?	1 M
2.	Define thread.	1 M
3.	What is the use of fork() and exec() system calls?	1 M
4.	What are the types of system calls?	1 M
5.	Define monitor.	1 M
6.	What is multi programming?	1 M
7.	Define paging.	1 M
8.	What is safe state?	1 M
9.	Write the format of c-scan disk scheduling algorithm.	1 M
10.	What is directory structure?	1 M

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

11.A).	Explain about desktop systems and multiprocessor systems.	10M

OR

11. B).	Discuss about different types of schedulers? Explain about process control block.	10M

12. A). Consider the following set of processes with the length of CPU burst time given in   10M
milliseconds

Process	burst time	priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

Calculate the waiting time and turnaround time of each process using priority scheduling
algorithm.

OR

12. B).	Explain Banker's algorithm to avoid deadlock.	10M
13. A).	Discuss about critical section problem? Explain how Monitors are better than semaphores.	10M

OR

13. B).	What are different inter process communication mechanisms? Explain.	10M

(P.T.O..)

14. A). Discuss about swapping in detail. 10M

OR

14. B). What is paging? Explain in detail about how to implement paging. 10M

15. A). Explain about directory implementation. 10M

OR

15. B). Explain bit vector and grouping techniques of free space management. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech III Semester Supplementary Examinations July-2025
Course Name	:	Basic Electrical and Electronics Engineering
Course Code	:	A402204
Branch	:	CE/ ME
Date & Session	:	10-07-2025 FN

Duration: 3 hours   **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions
Each question carries ONE mark.   **10x1=10M**

1.	State Ohm's law.	1 M
2.	What is reactive power?	1 M
3.	Differentiate normal switch and MCB.	1 M
4.	Why earthing is necessary in electrical equipment's?	1 M
5.	What is transformer?	1 M
6.	What is synchronous generator?	1 M
7.	What is the uses of filter in rectifier circuits? And name the filtering elements	1 M
8.	Write any three applications of Zennor diode.	1 M
9.	Name few merits of FET device.	1 M
10.	Define saturation region in transistors.	1 M

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

11.A). Find the current flowing through all resistors resistance by using Kirchhoff's voltage law / Mesh analysis in the Fig A.   10M
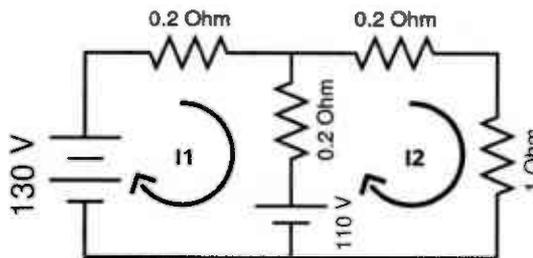

Fig A

OR

11. B). Develop the conversion from star to delta.   10M

12. A). Explain the working principle of MCB and MCCB with necessary diagrams.   10M

OR

12. B). Outline the different types of batteries with relevant characteristics.   10M

13. A). Explain the construction and working principle of DC Generator with necessary diagram.   10M

OR

13. B). Build the construction and explain working principle of Three Phase induction motor with necessary diagram.   10M

(P.T.O..)

14. A). Construct the working principle of full wave bridge rectifier with necessary circuit 10M
diagram, waveforms and derive its ripple factor.

OR

14. B). Construct the L-section filter and ∏ filter with the necessary diagrams and features. 10M

15. A). Construct CE transistor and explain its working principle with its relevant characteristics 10M

OR

15. B). Examine the CC configuration with its relevant characteristics. 10M

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H.T No: [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]   **R22**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	B.Tech III Semester Supplementary Examinations July-2025
Course Name	:	Basic Electrical Engineering
Course Code	:	A402201-R
Branch	:	CSC
Date & Session	:	12-07-2025 FN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
**Each question carries ONE mark.**   **10x1=10M**

1.	Define resistance.	1 M
2.	Explain KVL.	1 M
3.	Define frequency.	1 M
4.	Draw the V& I characteristics in R-L Series circuit.	1 M
5.	Explain concept of Ideal transformer.	1 M
6.	List different types of losses in transformer.	1 M
7.	State Faraday's Law.	1 M
8.	What are the advantages of three phase induction motors?	1 M
9.	Explain the major differences between MCB and MCCB.	1 M
10.	Give the importance of earthing.	1 M

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

11.A). State Thevenin's theorem and Calculate current flowing through 6 Ω resistance using   10M
Thevenin's theorem.
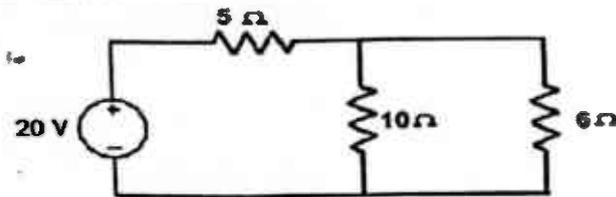
OR

11. B). Derive expression for the transient response of an R- C series circuit excited by DC   10M
supply.

12. A). Define the RMS value and obtain an expression for the RMS value of sinusoidal current.   10M

OR

12. B). A resistor of 250 ohms is connected in series with a 1.5 H inductor, across a 100 V, 50 Hz   10M
supply. Calculate Impedance and power factor.

13. A). Explain construction and operation of single-phase transformer.   10M

OR

13. B). Define auto transformer and derive the expression of saving of copper in auto transformer.   10M

(P.T.O..)

14. A). Explain different types of D.C generators with neat sketches.   10M

OR

14. B). Explain the construction and working principle of synchronous generators with a neat sketch.   10M

15. A). Explain the construction and working of MCB fuse with neat diagram.   10M

OR

15. B). Explain   10M
    i) Types of wires.
    ii) Types of cables.

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