



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

**B.Tech V Semester Supplementary Examinations June/July-2025**

**Course Name: Compiler Design**

(AIM)

**Date: 30.06.2025 FN**

**Time: 3 hours**

**Max.Marks: 70**

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

- |   |     |
|---|-----|
| 1. Compare Phase vs Passes of compiler.                       | 2 M |
| 2. Define compiler.   | 2 M |
| 3. Define ambiguous grammar.                                  | 2 M |
| 4. Outline the role of a parser?                              | 2 M |
| 5. Define attribute grammar.                                  | 2 M |
| 6. List the three kinds of intermediate representation.       | 2 M |
| 7. Define peephole optimization.                              | 2 M |
| 8. Write the usage of reference counting garbage collector.   | 2 M |
| 9. List any two Principal sources of optimization techniques. | 2 M |
| 10. Define Flow graph.  | 2 M |

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

- |   |    |
|---|----|
| 11.A). i) What are the different translation rules of a LEX program?                                | 5M |
| ii) Construct a Non deterministic finite automata (NFA) for the regular expression $(a + b)^*abb$ . | 5M |

**OR**

- |  |     |
|--|-----|
| 11. B). Illustrate the phases of compilation process with a neat sketch.   | 10M |
| 12. A). Compute FIRST and FOLLOW function for the given productions<br>$E \rightarrow TE'$ $E' \rightarrow +TE' \mid \epsilon$ $T \rightarrow FT'$ $T' \rightarrow *FT' \mid \epsilon$ $F \rightarrow (E) \mid id$ | 10M |

**OR**

- |  |     |
|--|-----|
| 12. B). Construct SLR parsing table for the given context-free grammar<br>$S \rightarrow AA$ $A \rightarrow aA \mid b$   | 10M |
| 13. A). Consider the following grammar Compute Syntax Directed Definition (SDD) $S \rightarrow E$<br>$E \rightarrow E1 + T$ $E \rightarrow T$ $T \rightarrow T1 * F$ $T \rightarrow F$ $F \rightarrow digit$ | 10M |

**OR**

- |   |     |
|---|-----|
| 13. B). Construct Quadruples, Triples and Indirect Triples for the statement<br>$a = b * -c + b * -c$   | 10M |
| 14. A). Generate the target code for the statement and identify the number of registers required for the given statements? $t8 = d + e$ , $t6 = a + b$ , $t5 = t6 - c$ , $t4 = t5 * t8$ , $t3 = t4 - e$ , $t2 = t6 + t4$ , $t1 = t2 * t3$ . | 10M |

**OR**

- |  |     |
|--|-----|
| 14. B). Explain about Storage allocation Strategies.                       | 10M |
| 15. A). Explain about various Machine independent optimization techniques. | 10M |

**OR**

- |  |     |
|--|-----|
| 15. B). Elaborate loop optimization techniques with example. | 10M |
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**R18**

Course Code: A36205



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

**B.Tech V Semester Supplementary Examinations June/July-2025**

**Course Name: Cryptography & Network Security**

**(CSC)**

**Date: 30.06.2025 FN**

**Time: 3 hours**

**Max.Marks: 70**

(Note: Assume suitable data if necessary)

**PART-A**

**Answer all TEN questions**

**Each question carries TWO marks.**

**10x2=20M**

- |     |  |     |
|-----|--|-----|
| 1.  | List the fundamental elements of abstract algebra or modern algebra. | 2 M |
| 2.  | Write the Euclidean Algorithm.                                       | 2 M |
| 3.  | Mention the strength of triple DES.                                  | 2 M |
| 4.  | Compare Block and Stream cipher.                                     | 2 M |
| 5.  | Define the classes of message authentication function.               | 2 M |
| 6.  | Give the applications of the public key cryptosystem.                | 2 M |
| 7.  | State the security services provided by digital signature.           | 2 M |
| 8.  | Mention the benefits of IPSec.                                       | 2 M |
| 9.  | Identify the protocols used to provide IP security.                  | 2 M |
| 10. | Point out the services provided by PGP.                              | 2 M |

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

- |           |   |     |
|-----------|---|-----|
| 11.A).    | Define discrete logarithm problem and explain its key properties.   | 10M |
| <b>OR</b> |   |     |
| 11. B).   | State the Chinese Remainder Theorem and find X for the given set of congruent equations $X \equiv 2 \pmod{3}$ , $X \equiv 3 \pmod{5}$ and $X \equiv 2 \pmod{7}$ . | 10M |
| 12. A).   | Compare transposition cipher and substitution cipher. Apply two stage transpositions Cipher on the "treat diagrams as single units" using the keyword "sequence". | 10M |
| <b>OR</b> |   |     |
| 12. B).   | Give the structure of AES. Explain how Encryption/Decryption is done in AES.  | 10M |
| 13. A).   | Explain Diffie Hellman key exchange with an example.  | 10M |
| <b>OR</b> |   |     |
| 13. B).   | Describe the compression of Secure Hash Algorithm.  | 10M |
| 14. A).   | Discuss any two digital signature schemes.  | 10M |
| <b>OR</b> |   |     |
| 14. B).   | Mention the different servers used in Kerberos and explain the role of each one.  | 10M |
| 15. A).   | Explain in detail the operation of Internet Key Exchange with an example.   | 10M |
| <b>OR</b> |   |     |
| 15. B).   | Identify the content types provided by S/MIME and describe each type briefly.   | 10M |

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**R18**

Course Code: A30514



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

**B.Tech V Semester Supplementary Examinations June/July-2025**

**Course Name: Computer Networks**

**(Common for CSE, IT, CSM, CSD & AID)**

**Date: 30.06.2025 FN**

**Time: 3 hours**

**Max.Marks: 70**

**(Note: Assume suitable data if necessary)**

**PART-A**

**Answer all TEN questions**

**Each question carries TWO marks.**

**10x2=20M**

1. Define network software and its primary purpose in a network. 2 M
2. What was the significance of ARPANET in the development of the Internet. 2 M
3. What is error detection, and why is it important in data communication? 2 M
4. Enlist design issues of the data link layer. 2 M
5. What are the different routing algorithms that can be used for network layer design? 2 M
6. List two methods for ensuring Quality of Service (QoS) in networks. 2 M
7. Draw the UDP Header? What are its features. 2 M
8. List two key elements of transport protocols. 2 M
9. How does DNS resolve a domain name to an IP address? 2 M
10. Name the main components involved in SNMP. 2 M

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

- 11.A). Explain the OSI reference model, with a neat figure, and briefly discuss the functions of each layer. 10M

**OR**

- 11.B). Describe the hidden terminal and exposed terminal problems in wireless networks. Explain how these issues affect network performance and discuss solutions like the RTS/CTS (Request to Send / Clear to Send) mechanism. 10M

- 12.A). Explain Check Sum error detection mechanism with example. 10M

**OR**

- 12.B). Describe the stop-and-wait protocol for an error-free channel. How does this protocol ensure that data is transmitted correctly? 10M

- 13.A). Describe the shortest path routing algorithm. Explain how algorithms like Dijkstra's and Bellman-Ford solve the problem of finding the most efficient path between two nodes in a network. 10M

**OR**

- 13.B). Explain the concept of Quality of Service (QoS) in the network layer. Discuss the methods used to ensure QoS, such as traffic shaping, scheduling, and prioritization. 10M

**(P.T.O.)**

14. A). Explain why UDP is preferred in real-time applications like voice and video streaming. 10M  
What are the advantages and limitations of UDP in comparison to TCP?

**OR**

14. B). Discuss the key elements of a transport protocol. 10M

15. A). Describe the structure and functions of E-mail protocol. 10M

**OR**

15. B). Define SNMP? Describe the key components of SNMP, including the manager, agent, and MIB (Management Information Base). 10M

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

B.Tech V Semester Supplementary Examinations June/July-2025

**Course Name: Formal Languages & Automata Theory**  
(Computer Science & Engineering)

Date: 02.07.2025 FN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

1. Explain the difference between Melay and Moore Machines. 2 M
2. Define Finite Automata. 2 M
3. Explain identities laws of regular expression. 2 M
4. Give regular expression generating the language of all strings over the alphabet {a, b} and ends with **ab**? 2 M
5. Give the CFG for the language  $(a^n b^n | n > 0)$ . 2 M
6. Draw a derivation tree for the string "bab" from the CFG given by  $S \rightarrow bSb | a | b$  2 M
7. Explain GNF Grammar with Example. 2 M
8. Define Ambiguity in CFG with an example. 2 M
9. Explain the applications of TM. 2 M
10. Explain post correspondence problem with an example. 2 M

**PART-B**

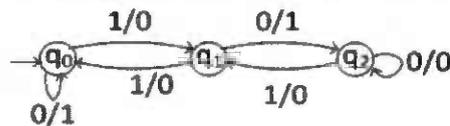
Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Find the minimum state finite automaton for the language that accepts the set of all strings containing 101 as substring over the alphabet {0,1}. 10M

**OR**

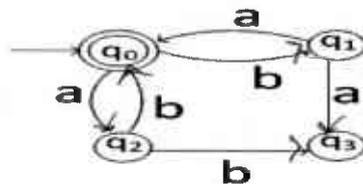
11. B). i) Construct DFA over the alphabet  $\Sigma = \{0,1\}$  to accept even 0's and 1's. 5M  
ii) Convert the following Melay machine into equivalent Moore machine. 5M



12. A). Find a Regular expression corresponding to each of the following subsets over  $\{0,1\}^*$ . 10M  
i) The set of all strings containing no three consecutive 0's  
ii) The set of all strings containing even number of 1's.

**OR**

12. B). Find the regular Expression for the language recognized by the following FA. 10M



(P.T.O..)

13. A). Convert the following grammar to a PDA that accepts the language by empty stack. 10M  
 $S \rightarrow 0S1 | A$   
 $A \rightarrow 1A0 | S | \epsilon$

**OR**

13. B). Design a PDA for accepting a language  $\{a^n b^{2n} \mid n \geq 1\}$ . 10M

14. A). i) Find the GNF equivalent to the following 5M

$S \rightarrow AA | a$

$A \rightarrow SS | b$

- ii) Show that the language  $L = \{0^n 1^n 2^n \mid n \geq 1\}$  is not context free. 5M

**OR**

14. B). i) Eliminate  $\epsilon$  Productions from Given CFG by preserving the meaning of it.? 5M

$S \rightarrow XYX$

$X \rightarrow 0X | \epsilon$

$Y \rightarrow 1Y | \epsilon$

- ii) Find the grammar in CNF equivalent to the following grammar. 5M

$E \rightarrow E+T/T,$

$T \rightarrow T * F / F,$

$F \rightarrow (E) / a$

15. A). Construct Turing machine to recognize the language 10M  
 $L = \{a^n b^n \mid n > 0\}$

**OR**

15. B). i) What is decidability? Explain any two undecidable problems. 5M

- ii) Explain closure properties of Recursive languages. 5M

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

**B.Tech V Semester Supplementary Examinations June/July-2025**

**Course Name: Automata & Compiler Design**  
(Common for IT & CSC)

Date: 02.07.2025 FN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

- |   |     |
|---|-----|
| 1. Distinguish token, pattern and lexem.  | 2 M |
| 2. What is LEX? Discuss its role in the compiler design.                        | 2 M |
| 3. Define ambiguous grammars with an example.                                   | 2 M |
| 4. What do you mean by attributed grammars?                                     | 2 M |
| 5. Define type checker.   | 2 M |
| 6. What is type conversion?   | 2 M |
| 7. Define heap storage allocation.  | 2 M |
| 8. Define the term data flow analysis.  | 2 M |
| 9. List the various object code forms.  | 2 M |
| 10. Develop code for the following C statements: i) $x=f(a)+f(a)$ ii) $y=x/5$ . | 2 M |

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- |   |     |
|---|-----|
| 11.A). i) Demonstrate the mathematical definition of DFA. Design DFA which accepts even number of a's and even number of b's where the input is {a,b}   | 5M  |
| ii) Define left recursion. Is the following grammar left recursive? $E \rightarrow E+E \mid E^*E \mid a \mid b$   | 5M  |
| <b>OR</b>   |     |
| 11. B). i) Explain the step-by-step method to generate equivalent FA for the regular expressions of different forms.  | 5M  |
| ii) List out the rules for FIRST and FOLLOW.  | 5M  |
| 12. A). Write the YACC specification of a simple desk calculator as given:<br>$E \rightarrow E+T \mid T \quad T \rightarrow T^*F \mid F \quad F \rightarrow (E) \mid \text{digit where digit between 0 to 9}$ | 10M |
| <b>OR</b>   |     |
| 12. B). Construct syntax directed translation scheme for a simple desk calculator.  | 10M |
| 13. A). Demonstrate between implicit and explicit type conversion.  | 10M |
| <b>OR</b>   |     |
| 13. B). Explain in detail about the specification of a simple type checker.   | 10M |
| 14. A). Discuss about the stack allocation strategy of runtime environment with an example.   | 10M |
| <b>OR</b>   |     |
| 14. B). Write about data flow analysis of structural programs.  | 10M |
| 15. A). Explain about the generic code generation algorithm with an example.  | 10M |
| <b>OR</b>   |     |
| 15. B). i) Show an example for an DAG used for register allocation.   | 5M  |
| ii) Write about Register allocation and register assignment.  | 5M  |

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

B.Tech V Semester Supplementary Examinations June/July-2025

**Course Name: Finite Automata and Compiler Design**  
(AID)

Date: 02.07.2025 FN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

1. Differentiate between DFA and NFA. 2 M
2. Write the structure of LEX-program. 2 M
3. What is handle pruning. Give an example? 2 M
4. Create FIRST and FOLLOW table for the given grammar: 2 M  
 $S \rightarrow Aa \mid bAc \mid Bc \mid bBa$        $A \rightarrow d$        $B \rightarrow d$
5. Write the role of type checking. 2 M
6. What is type conversion? 2 M
7. State the role of Symbol table format. 2 M
8. What do you mean by copy propagation? 2 M
9. List the issues in the design of code generators. 2 M
10. What is Labelling Algorithm? 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Define what is LL(k) grammar and consider the following grammar 10M  
 $S \rightarrow AB \mid ABad$        $A \rightarrow d$        $E \rightarrow b$        $D \rightarrow b \mid \epsilon$        $B \rightarrow c$   
 Construct the predictive parsing table. Show that the given grammar is LL(1) or not.

**OR**

11. B). i). Construct DFA for the given NFA. 5M

	0	1
$\rightarrow q_0$	(q0, q1)	q0
q1	q2	q1
q2	q3	q3
q3*	-	q2

- ii). Derive the string and construct a syntax tree for the input string ceadae using the 5M  
 grammar  $S \rightarrow SaA \mid A$        $A \rightarrow AbB \mid B$        $B \rightarrow cSd \mid e$

12. A). Consider the grammar given below. 10M

$S \rightarrow CC$

$C \rightarrow aC$

$C \rightarrow d$

Construct LALR parsing table for the above grammar and parse the string "adaad"

(P.T.O..)

**OR**

12. B). Write a short note on: 10M
- i. Synthesized attributes
  - ii. Inherited attributes
  - iii. Dependency graph
  - iv. Evaluation order
  - v. Directed Acyclic Graph (DAG).

13. A). Analyze the Chomsky hierarchy of languages and recognizers. 10M

**OR**

13. B). i). Discuss Overloading of functions and operations. 5M  
ii). What is Type expression? Demonstrate equivalence of type expressions with suitable examples. 5M

14. A). Discuss Storage allocation strategies with suitable examples. 10M

**OR**

14. B). i). Describe the various strategies in register allocation. 5M  
ii). Describe runtime storage management. 5M

15. A). Illustrate generic code generation algorithm with an example. 10M

**OR**

15. B). i). What are Object code forms? Explain. 5M  
ii). Discuss the applications of DAG. 5M

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**R18**

Course Code: A30527



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

B.Tech V Semester Supplementary Examinations June/July-2025

**Course Name: Information Security**

(Common for CSE & IT)

Date: 04.07.2025 FN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

1. Define information security and list out various security attacks. 2 M
2. Differentiate Passive attacks and Active attacks 2 M
3. Differentiate between symmetric encryption and asymmetric encryption 2 M
4. What is SHA-512? 2 M
5. What is the use of S/MIME? 2 M
6. Define digital signature. 2 M
7. Define the requirements of SET protocol. 2 M
8. What is IPsec and what are its applications? 2 M
9. List the types of intruders. 2 M
10. Write about firewall. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain about Security Attacks. 10M
- OR**
11. B). Explain Single round of DES algorithm in detail. 10M
12. A). Consider a Diffie-Hellman scheme with a common prime,  $q = 11$ , and a primitive root,  $\alpha = 2$ , then 7 M If A has a Public key,  $Y_a = 9$ , what is the A's Private Key  $X_a$ ? If B has a Public key,  $Y_b = 3$ , what is the shared secret key K? 10M
- OR**
12. B). Explain about HMAC Algorithm in detail. 10M
13. A). What are the design goals of Kerberos? 10M
- OR**
13. B). Outline the operations of Pretty Good Privacy (PGP). 10M
14. A). Describe in detail about combining security associations. 10M
- OR**
14. B). Explain differences between SSL and TLS. 10M
15. A). What is a virus? Explain different types of viruses. 10M
- OR**
15. B). Write about different classes of Intruders and Intrusion detection techniques. 10M

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**R18**

Course Code: A36217



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

**B.Tech V Semester Supplementary Examinations June/July-2025**

**Course Name: Cyber Laws & Ethics**

**(CSC)**

**Date: 04.07.2025 FN**

**Time: 3 hours**

**Max.Marks: 70**

**(Note: Assume suitable data if necessary)**

**PART-A**

**Answer all TEN questions**

**Each question carries TWO marks.**

**10x2=20M**

1. What is scope of IT Act 2000? 2 M
2. Recall the IT Act necessity. 2 M
3. Define Cyber space. 2 M
4. List Jurisdiction issues of IT Act 2000. 2 M
5. Where do we use Digital signature? 2 M
6. List any two Cyber regulations. 2 M
7. Spell the examples for IPR. 2 M
8. Classify Trademark disputes. 2 M
9. Why do you need Cloud Computing law? 2 M
10. What is UNCITRAL model law? 2 M

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

- 11.A). Explain in detail about the evolution of Indian IT Act and their phase wise achievements. 10M
- OR**
11. B). Explain about various authorities designated under IT ACT and focus on their powers. 10M
12. A). Contrast amendments to Reserve bank of India Act and emphasis on their significance. 10M
- OR**
12. B). Compare and contrast between amendments to Indian Evidence act and Bankers Book Evidence act. 10M
13. A). Analyze the work of the e-governance policy? Discover its practicability in India. 10M
- OR**
13. B). Elaborate on Appellate Tribunal responsibilities and its functionalities. 10M
14. A). Explain importance of SDPI in Cyber Law and emphasis on Reasonable security practices in India. 10M
- OR**
14. B). Analyze the jurisdiction laws in dealing with Trademark disputes with suitable case studies. 10M
15. A). Explain in detail about the public key functioning and Protection provided by the electronic signature. 10M
- OR**
15. B). Explain Implementation of Electronic signature laws in Major Countries. 10M

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**R18**

Course Code: A36603



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

**B.Tech V Semester Supplementary Examinations June/July-2025**

**Course Name: Artificial Intelligence and Applications**  
(CSM)

**Date: 04.07.2025 FN**

**Time: 3 hours**

**Max.Marks: 70**

**(Note: Assume suitable data if necessary)**

**PART-A**

**Answer all TEN questions**

**Each question carries TWO marks.**

**10x2=20M**

1. What is a knowledge representation problem in AI? 2 M
2. What is the difference between informed and uninformed search? 2 M
3. List two types of knowledge in AI. 2 M
4. What is completeness in the context of knowledge representation? 2 M
5. How does Dempster-Shafer Theory handle uncertainty? 2 M
6. What is the purpose of a planning problem formulation? 2 M
7. Define explanation-based learning (EBL). 2 M
8. What is a key feature of explanation-based learning? 2 M
9. What is the purpose of stop words in text classification? 2 M
10. What are the limitations of expert systems? 2 M

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

- 11.A). What are the different types of AI problems? Discuss the nature of these problems with relevant examples. 10M

**OR**

11. B). What is Alpha-Beta pruning, and how does it optimize the Min-Max algorithm in adversarial search with suitable example? 10M
12. A). i) What is predicate logic, and how does it extend propositional logic? 5M  
ii) Explain the syntax, semantics, and inference mechanisms of predicate logic with examples. 5M

**OR**

12. B). i) Explain the concept of frames in knowledge representation. 5M  
ii) Discuss the structure of frames, how they represent real-world knowledge, and provide examples of their application 5M
13. A). Discuss how probabilistic reasoning is used in AI systems for decision-making under uncertainty. 10M

**OR**

13. B). i) Explain the process of goal-directed planning in AI. 5M  
ii) Discuss the steps involved, including problem formulation, planning heuristics, and plan execution 5M

**(P.T.O..)**

14. A). i) Explain identification trees in machine learning. Discuss how they are used to represent concepts and solve problems. 5M  
ii) Compare identification trees with other tree-based learning methods, such as decision trees, in terms of their structure and application 5M

**OR**

14. B). i) Explain how explanation-based learning (EBL) can improve the efficiency of learning systems. 5M  
ii) Discuss its applications, advantages, and potential issues when applied to complex real-world problems 5M
15. A). What are word embeddings in NLP? Explain their significance in capturing semantic meaning and context in language processing tasks. 10M

**OR**

15. B). i) Explain the difficulties in developing expert systems. 3M  
ii) Discuss challenges such as knowledge representation, knowledge acquisition, handling uncertainty, and dealing with incomplete or ambiguous knowledge 7M

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**R18**

Course Code: A30529



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

B.Tech V Semester Supplementary Examinations June/July-2025

**Course Name: Software Testing Methodologies**

(Common for CSE & IT)

**Date: 04.07.2025 FN**

**Time: 3 hours**

**Max.Marks: 70**

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

1. Explain the Purpose of Testing. 2 M
2. What is path sensitization? 2 M
3. Compare data flow and path flow testing strategies. 2 M
4. Explain about path selection in transaction-flow testing 2 M
5. List the uses of Domain Testing 2 M
6. List various applications of paths. 2 M
7. Discuss path product with example. 2 M
8. Explain testability tips in software testing. 2 M
9. List the loop term step in the context of node reduction procedure. 2 M
10. Define Relation? List out various Relations. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain about life cycle of Bug with example. 10M
- OR**
11. B). Discuss various flow graph elements with their notations. 10M
12. A). What do you mean by Transaction Flow testing? Write short note on applications of Transaction Flow testing. 10M
- OR**
12. B). Describe the terms dicing, data flow and debugging and discuss the applications of data flow testing. 10M
13. A). Discuss in detail about the domains and interface testing 10M
- OR**
13. B). Evaluate the reduction procedure algorithm assuming an example. 10M
14. A). What are decision tables? Illustrate the applications of decision tables. How is a decision table useful in testing? Explain with an example. 10M
- OR**
14. B). Explain with an example how to convert specification into state-graph and how to handle contradictions. 10M
15. A). Outline the matrix operations in tool building. 10M
- OR**
15. B). Explain power of matrix with an Example. 10M

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**R18**

Course Code: A30516



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

B.Tech V Semester Supplementary Examinations June/July-2025

**Course Name: Operating Systems**

(Common for CSE & IT)

**Date: 07.07.2025 FN**

**Time: 3 hours**

**Max.Marks: 70**

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

1. What is a system call? Give an example. 2 M
2. Compare the difference between a simple batch system and a time-shared system? 2 M
3. Outline the difference between cooperative and preemptive scheduling. 2 M
4. Why context switching is considered an overhead. 2 M
5. State two key strategies for avoiding deadlock in operating systems. 2 M
6. Compare IPC mechanisms between processes on a single system and on different systems. 2 M
7. State the purpose of demand paging. 2 M
8. List two disadvantages of swapping. 2 M
9. State the importance of protection in file systems. 2 M
10. What does the ioctl system call accomplish? 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain the key characteristics of distributed operating systems and discuss the challenges associated with implementing distributed systems. 10M

**OR**

- 11.B). Discuss the importance of operating system services, providing examples of how these services enhance program execution and resource management. 10M

- 12.A). Explain the process of inter-process communication (IPC) using message passing and shared memory. 10M

**OR**

- 12.B). Consider a set of processes with the following arrival times and burst times: 10M

Process	Arrival Time (ms)	Burst Time (ms)
P1	0	8
P2	1	4
P3	2	9
P4	3	5

Calculate the completion time, waiting time, and turnaround time for each process and find the average waiting time and average turnaround time for each of the following scheduling algorithms: Shortest Remaining Time First (SRTF), Priority Scheduling (assuming lower burst time means higher priority and preemptive scheduling is allowed), Round Robin (RR) with a time quantum of 3 ms.

**(P.T.O.)**

13. A). Outline the critical section problem and discuss how synchronization hardware can aid in solving this issue. 10M

**OR**

13. B). Examine deadlock avoidance strategies and apply these strategies to a hypothetical scenario involving three processes and three types of resources. 10M

14. A). Illustrate the working of contiguous and non-contiguous memory allocation techniques. 10M

**OR**

14. B). Given the following page reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, and assuming a memory with 3 frames: Apply each of the following page replacement algorithms to the page reference string: 10M

First-In-First-Out (FIFO)

Least Recently Used (LRU)

Optimal (OPT)

For each algorithm, illustrate the steps in a table showing page frames after each page reference.

Calculate the total number of page faults for each algorithm.

Compare the results in terms of page fault.

15. A). Compare and contrast the different types of file allocation methods (contiguous, linked, and indexed). Include examples and diagrams for each method. 10M

**OR**

15. B). Explain the various access methods used in file systems with suitable example. 10M

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**R18**

Course Code: A36209



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

B.Tech V Semester Supplementary Examinations June/July-2025

**Course Name: Intrusion Detection & Prevention System**

(CSC)

**Date: 07.07.2025 FN**

**Time: 3 hours**

**Max.Marks: 70**

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

1. What type of attacks can be identified by intrusion detection systems? 2 M
2. Explore the challenges faced in designing IDS. 2 M
3. Define distributed IDS. 2 M
4. Write the main functionality of second tier in tiered intrusion detection? 2 M
5. What is threat briefing? 2 M
6. Formulate annualized loss expectancy. 2 M
7. What is bro intrusion detection? 2 M
8. What is the purpose of CISCO stealth watch? 2 M
9. Interpret the role of authorization in IDS legal issues. 2 M
10. Name industry-specific standard organization bodies in IDS. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Summarize various intrusion detection and prevention analysis schemes. 10M
- OR**
11. B). What is SVM? Explain how SVM helps in IDS to classify the network traffic? 10M
12. A). How centralized IDS works? List out its limitations and challenges. 10M
- OR**
12. B). Illustrate how information sharing is accomplished in cooperative IDS. 10M
13. A). Define likelihood. Summarize step-by-step executed process in quantifying risk. 10M
- OR**
13. B). Why is ROI important in intrusion detection security? Consider an organization invests Rs.50,000/year in IDS. Estimated annual loss from attacks without IDS is Rs. 100,000/- and annual loss with IDS is Rs.25,000/-. Calculate ROI. 10M
14. A). Draw the modular design architecture of prelude and explain the functionality of each component. 10M
- OR**
14. B). What are key characteristics of snorts IDS? Describe its modes of operations in detail. 10M
15. A). What are the key evidentiary issues in intrusion detection? Analyze the best practices to address evidentiary issues. 10M
- OR**
15. B). Justify how IDS digital evidence is processed for criminal prosecution? 10M

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**R18**

Course Code: A30523



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

**B.Tech V Semester Supplementary Examinations June/July-2025**

**Course Name: Web Technologies**

**(CSC)**

**Date: 09.07.2025 FN**

**Time: 3 hours**

**Max.Marks: 70**

**(Note: Assume suitable data if necessary)**

**PART-A**

**Answer all TEN questions**

**Each question carries TWO marks.**

**10x2=20M**

1. List the statements that are used to connect PHP with MySQL with an example. 2 M
2. Apply PHP script to find the length of the string. 2 M
3. Distinguish between inline and external CSS. 2 M
4. List the basic components of an XML document. 2 M
5. How is a servlet better than CGI in terms of performance? 2 M
6. Distinguish between Generic Servlet and HTTPServlet? 2 M
7. Illustrate the benefits of JSP over pure Servlet-based processing. 2 M
8. Discuss when and why scriptlets are used in JSP. 2 M
9. Analyze the pros and cons of using inline event handlers vs. event listeners (addEventListener) in JavaScript. 2 M
10. List the different ways to declare variables in JavaScript. 2 M

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

- 11.A). Develop a PHP program to check the user credentials, whether they are correct or not. If the credentials are correct then the user will be redirected to another page? 10M
- OR**
- 11.B). Design a PHP script for uploading a file to the server and display the uploaded files details. 10M
- 12.A). Demonstrate how to parse an XML file using SAX parser and extract data from specific tags. 10M
- OR**
- 12.B). Explain the table tags that display student marks and applies alternating row colors using CSS. 10M
- 13.A). Interpret the role of the HttpServletRequest and HttpServletResponse objects in the context of servlet-based web applications. Explain how these objects facilitate communication between a client (such as a web browser) and a server, and describe the key methods provided by each interface that are commonly used for handling form data. 10M
- OR**
- 13.B). Evaluate how effectively the servlet container manages the servlet life cycle by analyzing the roles of each life cycle method. In your assessment, consider how each method contributes to performance, scalability, and resource management in web applications. 10M

**(P.T.O..)**

14. A). Compare and contrast cookies and HTTP sessions as mechanisms for maintaining state in a web application. In what situations would one be preferred over the other? Support your answer with advantages and drawbacks of each method. 10M

**OR**

14. B). Compare the use of `<%@ include %>` directive and `<jsp:include>` action element for including external resources in a JSP page. Which one offers better performance and flexibility, and in what contexts? Provide a critical evaluation based on runtime behavior and application architecture." 10M

15. A). Explain how event handling works in JavaScript with an example of the onclick and onsubmit events. 10M

**OR**

15. B). Explain how JavaScript can access and modify DOM elements. Include examples using `getElementById`, `querySelector`, and `innerHTML`. 10M

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**R18**

Course Code: A30530



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

**B.Tech V Semester Supplementary Examinations June/July-2025**

**Course Name: Artificial Intelligence**

**(Common to CSE & IT)**

**Date: 09.07.2025 FN**

**Time: 3 hours**

**Max.Marks: 70**

**(Note: Assume suitable data if necessary)**

**PART-A**

**Answer all TEN questions**

**Each question carries TWO marks.**

**10x2=20M**

1. What is the difference between a rational agent and an intelligent agent? 2 M
2. What is the goal of Bidirectional Search? 2 M
3. Define Alpha–Beta Pruning. 2 M
4. Define constraint propagation. 2 M
5. What is knowledge engineering in First-Order Logic? 2 M
6. Define “mental object” with an example. 2 M
7. What is multi-agent planning in AI? 2 M
8. What is hierarchical planning? 2 M
9. What is uncertainty in artificial intelligence? 2 M
10. What is conditional probability? 2 M

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

- 11.A). Compare and contrast Breadth-first search, Depth-first search, and Uniform cost search with appropriate examples. 10M

**OR**

11. B). Describe Online Search Agents. How do they operate in an unknown environment? 10M
12. A). Explain the Optimal Decisions in Games using Minimax algorithm with a suitable example. 10M

**OR**

12. B). Explain propositional logic with examples. How is it used in the knowledge representation of agents? 10M
13. A). Explain the process of knowledge engineering in First-Order Logic. What are the key steps and challenges involved? 10M

**OR**

13. B). What are mental events and mental objects? Illustrate how are they represented in AI systems? 10M
14. A). Define Classical Planning. List the algorithms used for planning with state-space search and explain with examples. 10M

**OR**

14. B). What is planning and acting in nondeterministic domains? Elaborate with examples how AI handles uncertainty in planning. 10M
15. A). Discuss how agents act under uncertainty. How does probability help in such decision-making. 10M

**OR**

15. B). Differentiate between supervised learning and unsupervised learning. Provide examples. 10M

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**R18**

Course Code: A30528



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

B.Tech V Semester Supplementary Examinations June/July-2025

**Course Name: Data Warehousing & Data Mining**  
(Common for CSE, CSC & CSM)

Date: 14.07.2025 FN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

1. Compare Star schema and Snow flake schema. 2 M
2. List the steps in designing the data warehouse. 2 M
3. What is KDD? 2 M
4. What do you mean by Data reduction? 2 M
5. Define support and confidence. 2 M
6. Define apriori property. 2 M
7. What is classification? 2 M
8. Define Bayes theorem. 2 M
9. Classify various Clustering methods. 2 M
10. What is outlier detection? 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Draw and explain about Data ware house Architecture. 10M
- OR**
11. B). Describe in brief about Data warehouse implementation. 10M
12. A). Explain in detail about Data mining functionalities. 10M
- OR**
12. B). i) Describe about Data discretization. 5M  
ii) Discuss about Dimensionality reduction methods. 5M
13. A). Can we design a method that mines the complete set of frequent item sets without candidate generation? If yes, explain with an example. 10M
- OR**
13. B). What are the draw backs of Apriori Algorithm? Explain about FP Growth Concept in detail. 10M
14. A). Describe the data classification process with a neat diagram. How does the Naive Bayesian classification work? Explain. 10M
- OR**
14. B). Explain in detail about K-Nearest neighbor classification algorithm and characteristics. 10M
15. A). Define Clustering? Explain about types of data in cluster analysis. 10M
- OR**
15. B). Explain about K-means clustering and K-means additional issues. 10M

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**R18**

Course Code: A36605



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

B.Tech V Semester Supplementary Examinations June/July-2025

**Course Name: Theory of Computation**

(CSM)

**Date: 16.07.2025 FN**

**Time: 3 hours**

**Max.Marks: 70**

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

1. State the Transition Diagram and Transition Table for Deterministic Finite Automata which accepts the Strings whose length is atmost 2 i.e, length  $\leq 2$ . Given that  $\Sigma = \{a,b\}$ . 2 M
2. Design NFA to accept strings with 0's and 1's such that string end with 00 and determine equivalent DFA for it. 2 M
3. State the regular expression for the string length atmost 2. 2 M
4. Consider that  $\Sigma = \{a, b\}$ , State the regular expression for all strings in which no 2 a's are together. 2 M
5. Consider the productions of a grammar: 2 M  
 $S \rightarrow A1B$   
 $A \rightarrow 0A / \epsilon$   
 $B \rightarrow 0B / 1B / \epsilon$   
 For the String  $w = 00101$ , Find Leftmost Derivation and Rightmost Derivation.
6. Define Pushdown Automata. 2 M
7. Define Ambiguous Grammar. 2 M
8. Eliminate the useless symbols in the grammar: 2 M  
 $S \rightarrow a A | b B$   
 $A \rightarrow a A | a$   
 $B \rightarrow b B$   
 $D \rightarrow a b | E a$   
 $E \rightarrow a C | d$
9. Differentiate Between Recursively Enumerable Languages and Recursive Languages. 2 M
10. Define Computability. 2 M

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

- 11.A). i) State the transition diagram for the NFA that accept the set of strings of 0's and 1's such that the 10th symbol from right end is 1. Obtain the equivalent DFA for it. 5M
- ii) Convert the following Moore Machine into Mealy Machine, which counts the Occurrences of the Sequence "abb" in any Input Binary Strings over  $\{a, b\}$ . 5M

(P.T.O..)

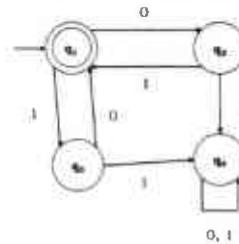
OR

11. B). i) State the transition diagram for the DFA with minimal number of states using Myhill-Nerode Theorem for the following automata. State "a" is the initial state and state "c" is the final state. 5M

	0	1
→ a	b	f
b	g	c
c	a	c
d	c	g
e	h	f
f	c	g
g	g	e
h	g	c

- ii) Construct the Mealy Machine that Takes Binary Number as Input and Produces 2's Complement of that Number as Output. Assume the String is Read LSB to MSB and the End Carry is Discarded. 5M

12. A). i) Obtain the Regular Expression for the given DFA using Arden's Theorem. 5M



- ii) Construct an equivalent NFA with  $\epsilon$ -Transitions for the following right-linear grammar: 5M

$$S \rightarrow 0A$$

$$A \rightarrow 10A \mid \epsilon$$

OR

12. B). i) Using Iterative Method, Obtain the Equivalent Regular Expression for the Following Deterministic Finite Automata. 5M

	0	1
q <sub>1</sub>	q <sub>2</sub>	q <sub>1</sub>
q <sub>2</sub>	q <sub>2</sub>	q <sub>1</sub>

- ii) Construct the Left-Linear and Right-Linear Grammar for the regular expression  $(0+1)^*00(0+1)^*$ . 5M

13. A). Solve the following grammar  $S \rightarrow aAa \mid bBb \mid BB$  10M

$A \rightarrow C, B \rightarrow S \mid A, C \rightarrow S \mid \epsilon$  for the string abaaba. Give

- i) Left most derivation, ii) Right most derivation, iii) Derivation Tree and iv) For the string abaabbba. find the right most derivation.

(P.T.O.)

**OR**

13. B). i) Consider the following Pushdown Automata which accepts L by Empty Stack and Convert it to Equivalent Pushdown Automata which accepts L by Final State. 5M

$M = (\{q_0, q_1\}, \Sigma = \{0, 1\}, \delta, q_0, Z_0, \emptyset, \Gamma)$  where  $\delta$  is given by

$\delta(q_0, 0, Z_0) = (q_0, 0Z_0)$

$\delta(q_0, 0, 0) = (q_0, 00)$

$\delta(q_0, 1, 0) = (q_1, 0)$

$\delta(q_1, 1, 0) = (q_1, 0)$

$\delta(q_1, 0, 0) = (q_1, \epsilon)$

$\delta(q_1, \epsilon, Z_0) = (q_1, \epsilon)$

- ii) Construct an equivalent PDA for the following Context Free Grammar 5M

$S \rightarrow aAA$

$A \rightarrow aS \mid bS \mid a$

14. A). Convert the following grammar into GNF: 10M

$A \rightarrow BC$

$B \rightarrow CA \mid b$

$C \rightarrow AB \mid a$

**OR**

14. B). i) Eliminate  $\epsilon$  - Productions from the Grammar: 5M

$S \rightarrow ABC \mid a \mid b \mid D$

$A \rightarrow BC \mid b$

$B \rightarrow b \mid \epsilon$

$C \rightarrow c \mid \epsilon$

$D \rightarrow d$

- ii) Construct a Turing Machine which Works as a Comparator. 5M

15. A). i) Explain Universal Turing Machine. 5M

- ii) Determine Find whether the following lists: 5M

a.  $M = (abb, aa, aaa)$  and  $N = (bba, aaa, aa)$

b.  $M = (ab, bab, bbaaa)$  and  $N = (a, ba, bab)$

have a Post Correspondence Solution.

**OR**

15. B). i) Plan and explain on decidable and un-decidable problems with an example. 5M

- ii) Explain Reducibility with an Example. 5M

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