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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Machine Learning**
Course Code : **A405320**
Branch : **Computer Science & Engineering**
Date & Session : **09-12-2025 AN** **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 perspectives and issues in machine learning. 1 M
2. What is linear separability? 1 M
3. Outline the usage of Radial basis function. 1 M
4. What is Soft Margin SVM? 1 M
5. How to use entropy as evaluation function? 1 M
6. Compare bagging and boosting techniques. 1 M
7. What is dimensionality reduction? 1 M
8. What is least square optimization? 1 M
9. Outline the role of Markov random Fields. 1 M
10. List out Markov chain monte carlo methods. 1 M

PART-B

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

11.A). What is supervised Learning? Explain various Supervised Learning techniques in detail. 10M

OR

11. B). You are given a simple data set with one feature x and a target variable y. The relationship between x and y is assumed to be linear, and the goal is to fit a linear regression model to predict y given x. The data is as follows: 10M

Sample	x	y
1	1	3
2	2	5
3	3	7
4	4	9
5	5	11

12. A). Analyze Back Propagation algorithm with suitable example. 10M

OR

12. B). Explain Support Vector Machine algorithm with suitable example? Identify the role of various kernel functions in SVM. 10M

(P.T.O..)

13. A). Find the class label for a test record {"Sanay", CGPA = High, Communication = Bad, Programming skills = Bad} using the following train data and construct Decision tree. 10M

CGPA	Communication	Programming Skill	Employable
High	Good	Good	Yes
Medium	Good	Good	Yes
High	Good	Bad	Yes
High	Good	Good	Yes
High	Bad	Good	Yes
Medium	Good	Good	Yes
Low	Bad	Bad	No
Low	Bad	Bad	No
Medium	Good	Bad	Yes
Medium	Bad	Good	No
Medium	Good	Bad	Yes

OR

13. B). Following is the training data for a group of athletes. Based on this data, use K-NN algorithm and classify Nikhil (Weight = 56 kg., Speed = 10 kmph) as a Good, Average, or Poor sprinter. (Consider **K=7**). 10M

Name	Weight (kg.)	Speed (kmph)	Class
Nitesh	55	9	Average
Gurpreet	58	8	Poor
Goutam	60	7.5	Poor
Gulshan	59	8.5	Average
Mohit	57	10	Good
Sahil	53	10.5	Good
Samyak	53	10	Good

14. A). Explain Principal Component Analysis (PCA)? Compute the eigenvectors and eigenvalues of the following matrix to identify the principal components for PCA. 10M

$$\text{matrix} = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}. \quad A$$

OR

14. B). Analyze genetic algorithms in detail? Illustrate their usage. 10M

15. A). Explain briefly about reinforcement Learning? Identify the various applications and impact of it. 10M

OR

15. B). Explain Hidden Markov models in detail. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Formal Languages and Automata Theory**
Course Code : **A405313**
Branch : **Computer Science & Engineering**
Date & Session : **10-12-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

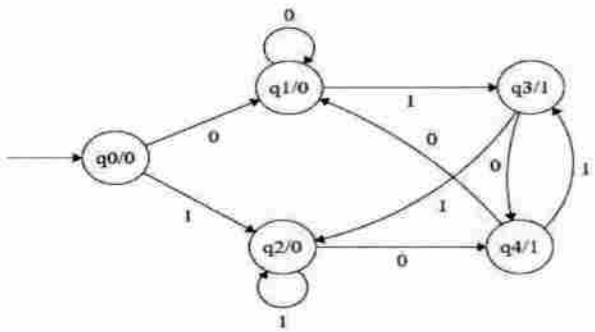
Each question carries ONE mark. **10x1=10M**

1. Define NFA. 1 M
2. Differentiate between Moore and Meley Machines. 1 M
3. Write the applications of Regular Expression. 1 M
4. Write the applications of Pumping Lemma. 1 M
5. Write a context-free grammar that generates the reverse of strings over the alphabet $\sum = \{A, B\}$. 1 M
6. Define PDA. 1 M
7. Mention any two closure properties of CFL. 1 M
8. What is Instantaneous Description? 1 M
9. Define counter machine. 1 M
10. What is Turing machine? 1 M

PART-B

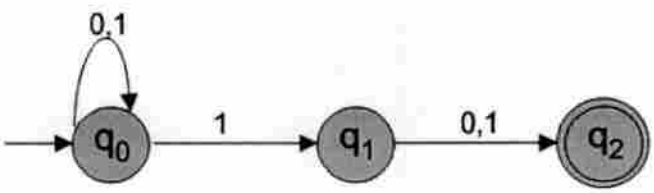
Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Convert the following Moore machine into its equivalent Melay machine. 10M



OR

11. B). Write the algorithm to convert NFA to DFA and Convert the following NFA to DFA. 10M



(P.T.O.)

12. A). Design a Finite Automata from the given RE [**ab + (b + aa)b* a**]. 10M

OR

12. B). i) Construct a regular grammar for the given regular expression ab(a+b)*. 5M

ii) Prove that the language L= $\{a^n b^n \mid n>=1\}$ is not regular using pumping lemma. 5M

13. A). i) Describe Instantaneous description (ID) in PDA. 5M

ii) Define push down automata? Explain acceptance of PDA with final state. 5M

OR

13. B). Construct a PDA that recognizes balanced parentheses. 10M

14. A). i) Define Ambiguous grammar with an example. 5M

ii) Remove Left recursion from the grammar. 5M

E->E+T/T

T->T*F/F

F->id

OR

14. B). i) State what is meant by derivation and parse tree with examples. 5M

ii) Construct Leftmost and Rightmost derivation and derivation tree for the string 0100110 5M

S $\longrightarrow$ 0S/1AA

A $\longrightarrow$ 0/1A/0B

B $\longrightarrow$ 1/0BB

15. A). i) Explain about the graphical notation of TM. 5M

ii) Find whether the lists 5M

M = (abb, aa, aaa) and N = (bba, aaa, aa) have a Post Correspondence Solution?

OR

15. B). Design a Turing Machine to accept the set of all palindrome over {0,1}*. Draw the transition diagram for the same. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Artificial Intelligence**
Course Code : **A405315**
Branch : **Computer Science & Engineering**
Date & Session : **19-12-2025 AN** **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 is an intelligent agent?	1 M
2.	List any two characteristics of problem-solving agents.	1 M
3.	Classify a constraint satisfaction problem.	1 M
4.	What are the components of propositional logic?	1 M
5.	Mention one use of first-order logic.	1 M
6.	What are ontological engineering and its significance?	1 M
7.	Summarize nondeterministic of in planning. domains with example.	1 M
8.	Illustrate hierarchical planning.	1 M
9.	What is Bayes' rule?	1 M
10.	Define joint distribution in probability.	1 M

PART-B

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

11.A).	Explain hill-climbing search and its limitations.	10M
	OR	
11. B).	Compare and contrast between Breadth-first Search and Depth-first Search algorithms.	10M
12. A).	What is alpha-beta pruning, and how does it optimize decision-making in games?	10M
	OR	
12. B).	Define the Wumpus World. Discuss its significance in knowledge-based agents.	10M
13. A).	Apply the syntax and semantics of First-Order Logic with examples.	10M
	OR	
13. B).	Compare propositional logic with First-Order Logic in terms of inference.	10M
14. A).	List the key differences between state-space search and hierarchical planning.	10M
	OR	
14. B).	Outline the limitations of classical planning and how they are addressed in real-world scenarios.	10M
15. A).	How are Bayesian networks used to represent uncertain knowledge? Illustrate with examples.	10M
	OR	
15. B).	Label the Relational Probabilistic Models in AI.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Cryptography and Network Security**
Course Code : **A405314**
Branch : **Computer Science & Engineering**
Date & Session : **12-12-2025 AN** **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 Cryptology. 1 M
2. What are the basic requirements to generate a cipher text? 1 M
3. What is Stream Cipher? 1 M
4. Define public key. 1 M
5. What is message digest? 1 M
6. Write any two applications of Hash algorithms. 1 M
7. What is SSL Connection? 1 M
8. List out the components of SSL. 1 M
9. List of two major services provided by PGP. 1 M
10. List out MIME content types. 1 M

PART-B

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

11.A). i) Apply Caesar Cipher to Encrypt the word "CMR COLLEGE", assume key as 5. 5M
ii) Apply Hill Cipher to Encrypt the word "PAYMOREMONEY", assume key as a 3X3 matrix [1, 2, 3, 3, 4, 5, 5, 6, 7]. 5M

OR

11. B). i) Describe the Active attacks and Passive Attacks. 5M
ii) Describe about Brute Force Attack. 5M

12. A). Explain 4 main operations of each round of AES algorithm. 10M

OR

12. B). Explain Deffie-Hellman algorithm and consider q=11, a=2, Private Key of A is $X_A = 9$, Private Key of B is $X_B = 4$ then calculate Y_A, Y_B and verify both Keys. 10M

13. A). Explain about Kerberos V4 with neat diagram. 10M

OR

13. B). Describe about HMAC. 10M

14. A). Explain Transport Layer Security Mechanism. 10M

OR

14. B). Describe about Wireless LAN Security. 10M

15. A). Explain the operational description of PGP. 10M

OR

15. B). Explain Encapsulating Security Payload (ESP) protocol. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Compiler Design**
Course Code : **A405317/ A462310**
Branch : **CSE/ CSC**
Date & Session : **13-12-2025 AN** **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. Differentiate Phase and Pass of compiler. 1 M
2. Define Lexeme. 1 M
3. List the procedure to compute FOLLOW set for grammar symbols of grammar. 1 M
4. Define ambiguous grammar. 1 M
5. Define L- attributed definition. 1 M
6. What is type checking? 1 M
7. List different forms of three address code. 1 M
8. Define activation record. 1 M
9. List the Issues in the design of code generator. 1 M
10. What is copy propagation? 1 M

PART-B

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

11.A). With a neat diagram explain the different phases of compiler. 10M

OR

11. B). What is LEX? Explain the format of LEX file. 10M

12. A). Construct SLR parsing table for the following grammar 10M

E → E + T | T
T → T F | F
F → F* | a | b , where V = {E,T,F} , T = { +, *, a, b } S = E.

OR

12. B). Construct LL(1) parsing table for the context free grammar 10M

bexpr → bexpr or bterm | bterm
bterm → bterm and bfactor | bfactor
bfactor → not bfactor | (bexpr) | true | false

Where V = { bexpr , bterm , bfactor } , T = { or, and , not , (,) , true, false} and S is bexpr.

(P.T.O..)

13. A). Explain how inherited attributes will be evaluated during bottom-up technique of semantic analysis. 10M

OR

13. B). Write the three-address code for the following code. 10M

```
begin
  PROD: = 0;
  I: =1;
  do
  begin
      PROD:=PROD + A[I]*B[I];
       I:=I+1;
   End
  while I<=20
end
```

14. A). Explain peephole optimization in detail. 10M

OR

14. B). Briefly discuss different methods for run time environments. 10M

15. A). Explain about global subexpression elimination and local common subexpression elimination. 10M

OR

15. B). Discuss the following optimization techniques 10M

i. Copy propagation
ii. Dead code elimination
iii. Loop Optimization.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Human Computer Interaction**
Course Code : **A405417**
Branch : **Computer Science & Engineering**
Date & Session : **20-12-2025 AN** **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 the screen design goals. 1 M
2. Tell me about the concept of direct manipulation. 1 M
3. Show the common information ordering screen. 1 M
4. How different interaction speeds can affect user in interface design? 1 M
5. Make use of auditory icons and soundscapes. 1 M
6. How to choose colors for multimedia? 1 M
7. What is gestural interaction? 1 M
8. Interpret the evaluation through user participation. 1 M
9. Define GOMS. 1 M
10. Outline Ambient-wood augmented reality. 1 M

PART-B

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

11.A). Which are the important human characteristics that have an influence on design? 10M

OR

11. B). What are the goals of user interface designer? Briefly explain about them. 10M

12. A). Demonstrate the qualities of screen design elements. 10M

OR

12. B). Define screen design and list the design goals of the screen design. 10M

13. A). Explain the characteristics of sentences and messages. 10M

OR

13. B). Compare and contrast between the device based and screen-based control. 10M

14. A). Develop the Principles, standards and guidelines which are part of Design rules. 10M

OR

14. B). What are the several interaction styles? Extend with neat diagram. 10M

15. A). Examine the detailed note on Cognitive models Goal and task hierarchies. 10M

OR

15. B). Give an explanation of ubiquitous computing. Explain how ubiquitous computing functions in a smart home application. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Embedded Systems**
Course Code : **A412309**
Branch : **Information Technology**
Date & Session : **09-12-2025 AN** **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. Name any two embedded hardware units. 1 M
2. What is the role of embedded software? 1 M
3. Define interrupt. 1 M
4. What is the function of memory address in ES? 1 M
5. Define RTC. 1 M
6. Differentiate between I2C and SPI. 1 M
7. Write a simple macro definition in C. 1 M
8. List any two data types used in embedded C. 1 M
9. What are task states in RTOS? 1 M
10. What is shared data in embedded systems? 1 M

PART-B

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

11.A). Describe the characteristics and quality attributes of embedded systems. 10M

OR

11. B). Illustrate the architecture of an embedded system. 10M

12. A). Explain memory types in embedded systems with examples. 10M

OR

12. B). Evaluate the interrupt service mechanism with a suitable block diagram. 10M

13. A). Explain the working of PCI parallel bus communication protocol. 10M

OR

13. B). Compare different onboard communication devices. 10M

14. A). Explain various programming elements in embedded C with code snippets. 10M

OR

14. B). Design a simple embedded firmware application using structured programming in C. 10M

15. A). Explain the OS memory management services used in embedded systems. 10M

OR

15. B). Illustrate the concept of inter-task communication using pipes. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Information Security**
Course Code : **A412310**
Branch : **Information Technology**
Date & Session : **10-12-2025 AN** **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 security services? 1 M
2. What is network security model? 1 M
3. What are the advantages of Key Distribution? 1 M
4. Write about strength of DES algorithm. 1 M
5. What is Biometric authentication? 1 M
6. Define Message Authentication Code. 1 M
7. Give features of Authentication Header. 1 M
8. What are the web security requirements? 1 M
9. What is Firewall? 1 M
10. What are Trusted systems? 1 M

PART-B

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

11.A). Explain the types of security attacks. 10M

OR

11. B). Explain the DES algorithm. 10M

12. A). Explain the concept of Diffie Hellman key exchange. 10M

OR

12. B). i) Explain about key distribution. 5M
ii) In an RSA system, the public key of a given user is e=31, n=3599. What is the private key of this user? 5M

13. A). Explain X.509 authentication service. 10M

OR

13. B). i) Explain about S/MIME. 5M
ii) What are digital signature and digital signature standards? 5M

14. A). Draw the IP security authentication header and explain the functions of each field. 10M

OR

14. B). i) List and briefly define the parameters that define an SSL session state. 5M
ii) What are different services provided by the SSL Record Protocol? 5M

15. A). i) What are includers? Explain types of includers. 5M
ii) What are the various virus counter measures? 5M

OR

15. B). List the characteristics of a good firewall implementation? How is circuit gateway different from application gateway? 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Scripting Languages**
Course Code : **A412308**
Branch : **Information Technology**
Date & Session : **19-12-2025 AN** **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 the key features of Ruby on Rails. 1 M
2. What are widgets in RubyTk? 1 M
3. What is the Jukebox extension? 1 M
4. How does Ruby handle memory allocation for objects? 1 M
5. What is the difference between a script and a program? 1 M
6. What is a scalar variable in Perl? 1 M
7. What are the basic principles of object-oriented programming in Perl? 1 M
8. Mention two common security issues in Perl-based web applications. 1 M
9. What is the basic structure of a TCL program? 1 M
10. What is a widget in the Tk toolkit? 1 M

PART-B

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

11.A). Analyze the advantages of using Ruby on Rails for web development compared to traditional CGI scripting. 10M

OR

11. B). Write a Ruby program that reads a list of numbers and prints the sum and explain the execution flow. 10M

12. A). Analyze how Ruby objects are represented and manipulated in C. Illustrate with code examples for defining a custom class in C. 10M

OR

12. B). Explain Ruby's garbage collection and memory allocation strategies. 10M

13. A). Analyze the use of arrays, lists, and hashes in Perl. Illustrate with code examples showing how data is stored and retrieved. 10M

OR

13. B). Compare client-side and server-side web scripting with examples. 10M

14. A). Analyze the use of advanced looping techniques in Perl such as loop labels, redo, next, and last. 10M

OR

14. B). Develop a Perl script that interfaces with the operating system to monitor memory usage and running processes. 10M

15. A). Write a TCL script that declares and uses different types of variables. 10M

OR

15. B). Demonstrate error handling in TCL using the catch command. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Cloud Computing**
Course Code : **A412311**
Branch : **Information Technology**
Date & Session : **12-12-2025 AN** **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 the components of Cloud Computing?	1 M
2.	Define cloud computing.	1 M
3.	Define Web 3.0.	1 M
4.	What do you mean by Public Cloud?	1 M
5.	What is Map Reduce?	1 M
6.	Define Infrastructure as a Service.	1 M
7.	Define Cloud Data Management Interface.	1 M
8.	What is data deduplication?	1 M
9.	What are security fundamentals of Cloud?	1 M
10.	Define Risk Mitigation.	1 M

PART-B

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

11.A).	Discuss the evolution of cloud computing and its significance in modern IT.	10M
	OR	
11. B).	Analyze the advantages and challenges associated with cloud computing adoption.	10M
12. A).	Describe the layered architecture of cloud computing.	10M
	OR	
12. B).	Apply the concept of elasticity to design a scalable cloud application.	10M
13. A).	Describe the role of virtualization in cloud computing.	10M
	OR	
13. B).	Examine the security implications of using public cloud services.	10M
14. A).	Discuss the architecture and working of cloud storage systems.	10M
	OR	
14. B).	Describe the various types of cloud storage: block, file, and object storage.	10M
15. A).	Discuss the major security challenges in cloud computing and mitigation strategies.	10M
	OR	
15. B).	Describe various security mechanisms employed in cloud environments.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Advanced Operating Systems**
Course Code : **A412406**
Branch : **Information Technology**
Date & Session : **13-12-2025 AN** **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 communication primitives.	1 M
2.	Define Lamport's Logical Clock.	1 M
3.	Name any one non-token-based algorithm.	1 M
4.	What is mutual exclusion?	1 M
5.	Define deadlock in a distributed system.	1 M
6.	What is centralized deadlock detection?	1 M
7.	Define process synchronization.	1 M
8.	Mention a benefit of using multiprocessors.	1 M
9.	What is distributed shared memory (DSM)?	1 M
10.	Define memory coherence.	1 M

PART-B

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

11.A).	Compare and contrast synchronous and asynchronous distributed systems.	10M
	OR	
11. B).	Discuss the concept and process of termination detection.	10M
12. A).	Explain Lamport's Algorithm for mutual exclusion.	10M
	OR	
12. B).	Describe Ricart-Agrawala Algorithm.	10M
13. A).	Discuss deadlock handling strategies in distributed systems with examples.	10M
	OR	
13. B).	Briefly explain about Centralized deadlock detection algorithm.	10M
14. A).	Discuss multiprocessor operating systems and design issues.	10M
	OR	
14. B).	Explain design issues of Distributed File Systems.	10M
15. A).	Describe task migration and challenges involved in it.	10M
	OR	
15. B).	Explain memory coherence in distributed systems.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Software Engineering**
Course Code : **A462307**
Branch : **CSC**
Date & Session : **09-12-2025 AN** **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 is Agile Model?	1 M
2.	List the characteristics of Software.	1 M
3.	What is Ethnography?	1 M
4.	Give the types of interviews in software requirement process.	1 M
5.	What is control hierarchy?	1 M
6.	Define cohesion.	1 M
7.	What is Smoke testing?	1 M
8.	Define Validation testing.	1 M
9.	What is a Risk?	1 M
10.	Define SQA.	1 M

PART-B

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

11.A).	Explain in detail about Spiral model and give advantages and disadvantages.	10M
	OR	
11. B).	Discuss the software engineering 'A Layered Technology' in detail	10M
12. A).	Explain the different techniques used in Requirements discovery.	10M
	OR	
12. B).	Discuss the different checks in requirement validations in detail.	10M
13. A).	Explain Software architecture and control hierarchy in detail.	10M
	OR	
13. B).	Design a student registration using UML Usecase,Sequence,Activity and Class diagrams.	10M
14. A).	Define Integration testing? Explain different techniques used in integration testing.	10M
	OR	
14. B).	What is System testing? Explain techniques used in System testing.	10M
15. A).	Explain Risk Projection techniques in detail.	10M
	OR	
15. B).	What is Software reliability? Explain techniques used in software reliability.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	**B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name	:	**Vulnerability Assessment and Penetration Testing**
Course Code	:	**A462308**
Branch	:	**CSC**
Date & Session	:	**10-12-2025 AN** **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 is the need of Ethical Hacking?	1 M
2.	List advantages of Penetration testing.	1 M
3.	What are the uses of conducting Insider attack?	1 M
4.	What is Metasploit?	1 M
5.	How can we plan for a penetration testing?	1 M
6.	Define the structure of penetration testing.	1 M
7.	What are the security aspects in testing?	1 M
8.	What is the need of SQL Injection?	1 M
9.	What do you mean by XSS attack?	1 M
10.	What is the need of Malware avoidance in software development?	1 M

PART-B

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

11.A).	Explain why do you need to understand your enemy's tactics.	10M
	OR	
11. B).	Explain how to be defending against social engineering attacks.	10M
12. A).	Explain why Physical penetration is important in software development? Justify with example.	10M
	OR	
12. B).	Explain about exploiting client-side vulnerabilities with example.	10M
13. A).	Apply the local buffer overflow exploits in the real-world scenario.	10M
	OR	
13. B).	Explain how the structured Exception Handling is performed.	10M
14. A).	Analyze top web application security vulnerabilities.	10M
	OR	
14. B).	Analyze the cross-site scripting vulnerabilities with real world examples.	10M
15. A).	Analyze latest trends in Honey net Technology with examples.	10M
	OR	
15. B).	Analyze collecting Malware and initial analysis with examples.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	**B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name	:	**Network Management Systems and Operations**
Course Code	:	**A462309**
Branch	:	**CSC**
Date & Session	:	**19-12-2025 AN** **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 two reasons for the lack of strong industry response to network management challenges.	1 M
2.	What is the function of a DHCP server in a network?	1 M
3.	What role do standards play in managing variety in multi-vendor environments?	1 M
4.	Define the term "partial state" in configuration management.	1 M
5.	What is a network fault? Give two common examples.	1 M
6.	List any three measurable items used in network performance assessment.	1 M
7.	What is an acceptable use policy (AUP)? Give one example.	1 M
8.	List any two methods used for user authentication.	1 M
9.	What is the "Principle of Most Recent Change" in network management?	1 M
10.	How does a 'ping' tool help in connectivity testing?	1 M

PART-B

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

11.A).	Discuss the major challenges in managing modern networks in the context of increasing Internet complexity and distributed systems.	10M
	OR	
11. B).	Describe how DSLAM works in a DSL modem system and its role in broadband connectivity.	10M
12. A).	What are the key problems addressed by network management systems, and how do they help reduce operational overhead?	10M
	OR	
12. B).	Explain the concept of snapshots in configuration management. How do snapshots aid in recovery and consistency?	10M
13. A).	Evaluate the role of anomaly detection and event correlation in proactive fault management. Include techniques commonly used.	10M
	OR	
13. B).	Outline the process of assessing network performance from the perspective of both the infrastructure and the end-user.	10M
14. A).	Identify and describe at least four basic technologies used to enforce security (e.g., firewalls, encryption, intrusion detection systems).	10M
	OR	
14. B).	Explain how role-based access control (RBAC) simplifies access permissions. Provide a use case from an organization.	10M

(P.T.O..)

15. A). Explain the importance of using a separate management network. What are its advantages and potential challenges? 10M

OR

15. B). Design a basic layout for a network management system for a medium-sized enterprise using various tool categories like performance, configuration, security, and monitoring. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Cloud Computing**
Course Code : **A462408**
Branch : **CSC**
Date & Session : **12-12-2025 AN** **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.	Write about nano computing?	1 M
2.	Define Optical Computing.	1 M
3.	What is cloud computing?	1 M
4.	State the need for cloud computing.	1 M
5.	Name the three service layers in cloud computing.	1 M
6.	What is virtualization in cloud computing?	1 M
7.	Write down the pros and cons of Infrastructure as a service.	1 M
8.	List out various SaaS providers.	1 M
9.	What is the main purpose of Google Cloud Connect?	1 M
10.	What is EMC IT?	1 M

PART-B

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

11.A).	What is high performance computing? How to achieve it? Explain different technologies used to achieve high performance computing.	10M
	OR	
11. B).	In detail, explain the following computing paradigms i) Mobile Computing ii) Cluster Computing.	10M
12. A).	Discuss in detail about different deployment models of cloud.	10M
	OR	
12. B).	What are the principles of cloud computing? Explain in detail.	10M
13. A).	Explain how cloud applications are managed.	10M
	OR	
13. B).	Give an insight on the anatomy of the cloud.	10M
14. A).	What is Software-as-a-Service (SaaS)? Explain the characteristics of SaaS.	10M
	OR	
14. B).	How the Platform as a Service changes the application developer? Provide a detailed overview of the Platform as a service of the cloud.	10M
15. A).	Describe various services provided by Amazon simple storage Cloud in detail.	10M
	OR	
15. B).	Explain briefly about Captiva Cloud Toolkit.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Natural Language Processing**
Course Code : **A466309/ A473308/ A467309**
Branch : **CSM/ AIM/ CSD**
Date & Session : **12-12-2025 AN** **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 properties of Morphological models. 1 M
2. List Document Structure components. 1 M
3. Recall the role of a Parser. 1 M
4. What is a treebank? 1 M
5. Spell multilingual issues. 1 M
6. Show applications of Word Sense. 1 M
7. Infer Predicate argument structure. 1 M
8. What does meaning representation system is used? 1 M
9. Define bi-gram model. 1 M
10. Classify Language models. 1 M

PART-B

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

11.A). Explain about the components of Morphological model and specify the association with grammatical rules. 10M

OR

11. B). How can natural language processing (NLP) techniques be used to automatically identify and extract structural elements from documents? Specify the challenges of current approaches? 10M

12. A). Outline the flow of Parsing Natural language and discuss about steps present in it. 10M

OR

12. B). Classify Parsing algorithms. Interpret their scope with an example each. 10M

13. A). Examine the role of Ambiguity resolution in Parsing? Explain about a model that effectively deals with it. 10M

OR

13. B). Analyze the phases of Semantic Interpretation process with a suitable example. 10M

14. A). Elaborate the process of identifying the relationships between a predicate and its arguments with examples. 10M

OR

14. B). Explain in detail about the role of Predictive Argument Structure in Information extraction systems. 10M

(P.T.O.)

15. A). Discover the adoption procedure for a Multilingual Model to a context with help of an example. 10M

OR

15. B). Make use of various N-gram models. Discuss in details the Language model evaluation criteria. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Knowledge Representation and Reasoning**
Course Code : **A466307/A473306**
Branch : **CSM/ AIM**
Date & Session : **10-12-2025 AN** **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 knowledge representation.	1 M
2.	What is the role of logic in AI?	1 M
3.	Give an example of a top-level ontological category.	1 M
4.	Differentiate between sets and collections.	1 M
5.	Define knowledge engineering.	1 M
6.	State the rules in knowledge representation.	1 M
7.	Define events in the context of processes.	1 M
8.	Mention any one application of context in knowledge representation.	1 M
9.	What is fuzzy logic?	1 M
10.	State one tool used for knowledge acquisition.	1 M

PART-B

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

11.A).	Explain in detail the historical background and importance of logic in knowledge representation.	10M
	OR	
11. B).	Discuss the impact of logical representation on intelligent system design.	10M
12. A).	Explain ontological categories with examples.	10M
	OR	
12. B).	Classify and describe types and categories used in ontology.	10M
13. A).	Explain the structure and application of frame-based knowledge representation.	10M
	OR	
13. B).	Distinguish the different levels of representation in knowledge systems.	10M
14. A).	Analyze the classification of processes with real-world examples.	10M
	OR	
14. B).	Create a model demonstrating encapsulated objects within dynamic contexts.	10M
15. A).	Analyze the role of vagueness and uncertainty in reasoning systems.	10M
	OR	
15. B).	Design a hybrid knowledge representation framework combining multiple paradigms.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Principles of Data Analytics**
Course Code : **A466308/ A473307**
Branch : **CSM/ AIM**
Date & Session : **19-12-2025 AN** **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 is the main goal of data architecture? 1 M
2. What is a data outlier? 1 M
3. What programming language is widely used in data science and analytics? 1 M
4. What is the purpose of data modeling? 1 M
5. What is regression used for in data analytics? 1 M
6. What does the confusion matrix measure? 1 M
7. What is the main input difference between supervised and unsupervised learning? 1 M
8. What is pruning in decision trees? 1 M
9. What is the basic visual element used in pixel-oriented visualization? 1 M
10. What kind of data structure is visualized using hierarchical visualization techniques? 1 M

PART-B

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

11.A). Discuss different types of data sources such as sensors, signals, GPS, and social media. Highlight the characteristics, advantages, and challenges associated with each data source. 10M

OR

11. B). Explain the steps involved in data preprocessing. Discuss techniques such as data cleaning, transformation, normalization, and feature extraction with examples. 10M

12. A). Describe commonly used data analytics tools such as Excel, Python, R, Tableau, Power BI, SQL. Discuss their features, benefits, and suitability for various types of analytics tasks. 10M

OR

12. B). What is missing data? Discuss the causes and types of missing data: MCAR, MAR, MNAR. Explain any three imputation techniques and their impact on analysis results. 10M

13. A). What is variable rationalization? Discuss the importance of variable selection and elimination in building a robust regression model. Compare techniques like Forward Selection, Backward Elimination, and Stepwise Regression. 10M

OR

13. B). Describe how logistic regression is applied in business domains such as: (i) Customer churn prediction (ii) Fraud detection (iii) Healthcare (e.g., disease diagnosis). Provide examples and explain how the results influence decision-making. 10M

(P.T.O.)

14. A). Explain the process of building decision trees for both regression and classification. Discuss how splitting criteria differ and include examples of use cases where each type of tree is applicable. 10M

OR

14. B). What is the ARIMA model in time series forecasting? Explain the components (AR, I, MA), the assumptions of the model, and how to determine the model parameters using ACF and PACF plots. 10M

15. A). What are geometric projection techniques in data visualization? Describe how methods like Scatterplots, Parallel Coordinates, and Principal Component Analysis (PCA) are used to visualize high-dimensional data. Illustrate with diagrams or applications. 10M

OR

15. B). Discuss icon-based visualization techniques. Explain how methods such as for example: Star Glyphs, Chernoff Faces, and Stick Figures encode multidimensional data into icons. What are the advantages and limitations of using icon-based techniques compared to pixel or geometric projection methods? 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Nature Inspired Computing**
Course Code : **A466306/ A473305**
Branch : **CSM/ AIM**
Date & Session : **09-12-2025 AN** **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 "Evolutionary Computing". 1 M
2. List two common search algorithms discussed in the context of problem-solving. 1 M
3. What is the primary biological system that inspires "Neurocomputing"? 1 M
4. Name one common "learning algorithm" used in ANNs. 1 M
5. Define "Swarm Intelligence". 1 M
6. Name a specific problem that "Ant Colonies" algorithms are known to solve. 1 M
7. What is the primary purpose of "Negative Selection Algorithms"? 1 M
8. What is the concept of "Clonal Selection"? 1 M
9. List one type of data commonly analyzed in "Bio-informatics". 1 M
10. Name a common chart type used in "Information Display". 1 M

PART-B

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

11.A). Discuss the critical adaptations of concepts "From Evolutionary Biology to Computing" that enable the development of powerful optimization algorithms. 10M

OR

11. B). Explain "Problem Solving as a Search Task". 10M

12. A). Compare and contrast the architecture and functional principles of Nervous System with a typical Artificial Neural Network. 10M

OR

12. B). Describe the roles of the input layer, hidden layers, output layer, of a specific learning algorithm. 10M

13. A). Explain the concept of "Social Adaptation of Knowledge" in the context of swarm intelligence. 10M

OR

13. B). Outline how the "Ant Colonies" optimization algorithm could be adapted to solve a real-world problem. 10M

14. A). Explain about the usage of "Negative Selection Algorithms in various computational environments. 10M

OR

14. B). Explain in detail about Clonal Selection and Affinity Maturation. 10M

15. A). Compare and contrast the role of "Bio-informatics" in basic scientific discovery versus its application in clinical diagnostics. 10M

OR

15. B). Design an "Information Display" system for real-time traffic flow monitoring in a metropolitan area, aimed at emergency services. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	**B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name	:	**Software Testing Methodologies**
Course Code	:	**A466405/ A473405**
Branch	:	**CSM/ AIM**
Date & Session	:	**13-12-2025 AN** **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 testing. 1 M
2. State Builder vs Buyer. 1 M
3. Give any two examples for nice domains. 1 M
4. What is interface testing? 1 M
5. Define path product. 1 M
6. State absorption law. 1 M
7. What is an unreachable state? 1 M
8. Define Inputs and transitions. 1 M
9. Write the expression for the power of a matrix. 1 M
10. Define Asymmetric relation. 1 M

PART-B

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

11.A). i) List the phases in tester's mental life. 4M
ii) Compare and contrast testing and debugging. 6M

OR

11. B). What is path sensitization? Illustrate with an example. 10M

12. A). Explain with an example, the data flow graphs and data flow anomalies. 10M

OR

12. B). i) Compare and contrast nice domains and ugly domains. 5M
ii) Illustrate with an example, All-computational-uses (APU) strategy. 5M

13. A). i) List the steps in node reduction procedure. 4M
ii) Explain maximum path count arithmetic using node reduction method. 6M

OR

13. B). Explain with suitable examples prime implicant, sum of product form and product of sum form. 10M

14. A). The behavior of a finite state machine is invariant under all encodings. Justify? 10M

OR

14. B). i) What are the principles of state testing. Discuss advantages and disadvantages. 5M
ii) Explain about good state and bad state graphs. 5M

(P.T.O..)

15. A). i) How can the graph be represented in Matrix form? 3M

ii) Write about matrix powers and products. 7M

OR

15. B). i) What are the matrix operations in tool building? 4M

ii) List and explain the steps in node reduction algorithm. 6M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Pattern Recognition**
Course Code : **A466407**
Branch : **CSM**
Date & Session : **13-12-2025 AN** **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 is dimensionality reduction? 1 M
2. List the two main paradigms of pattern recognition. 1 M
3. Define the basic principle of the k-NN classifier. 1 M
4. What is the role of prior probability in Bayes classification? 1 M
5. What is the difference between MM and HMM? 1 M
6. What are the strengths and weaknesses of Decision Trees? 1 M
7. Define SVM. 1 M
8. List the different methods for combining classifiers. 1 M
9. List the stages in clustering. 1 M
10. What is Agglomerative clustering? 1 M

PART-B

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

11.A). Discuss feature extraction techniques with examples. 10M

OR

11. B). Explain PCA and its application in feature reduction. 10M

12. A). Describe Bayesian Belief Networks with suitable examples. 10M

OR

12. B). Explain the basic Nearest Neighbour (NN) algorithm and its working with a suitable example. 10M

13. A). How are the decision trees used for pattern classification? 10M

OR

13. B). How are Markov Models used for classification? 10M

14. A). Explain how a feed-forward neural network operates and learns. 10M

OR

14. B). Explain the methods for combining classifiers. 10M

15. A). Why is clustering important? Explain with an example? 10M

OR

15. B). What are the limitations of k-means, and how are they addressed? 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Computer Vision and Robotics**
Course Code : **A466408**
Branch : **CSM**
Date & Session : **13-12-2025 AN** **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. How does a pinhole camera form an image? 1 M
2. How is light measured in space? 1 M
3. What is the relationship between spatial frequency and Fourier transforms? 1 M
4. What is texture in an image? 1 M
5. What is Stereopsis? 1 M
6. What is the purpose of camera calibration in multiple view geometry? 1 M
7. What role does Euclidean geometry play in modeling cameras? 1 M
8. Define analytical photogrammetry. 1 M
9. Name one representative architecture of the hierarchical paradigm. 1 M
10. Define behavioral sensor fusion. 1 M

PART-B

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

11.A). i) Compare and contrast different local shading models. 5M
ii) Describe the difference between radiance and irradiance with formulas. 5M

OR

11. B). Describe the geometry involved in image projection in a pinhole camera. 10M

12. A). i) Explain how sampling and aliasing affect image representation. How can aliasing be avoided. 5M
ii) Discuss the impact of noise on derivative estimation and edge localization. 5M

OR

12. B). Discuss the process and challenges of synthesizing textures using local models. 10M

13. A). i) Describe how the fundamental matrix is computed from point correspondences. 5M
ii) Compare binocular fusion in humans with stereo matching algorithms. 5M

OR

13. B). i) Compare graph-theoretic clustering with k-means clustering for segmentation. 5M
ii) Evaluate the importance of calibration in multi-view reconstruction. 5M

14. A). Examine the following Segmentation by Fitting a Model 10M
i) Fitting Lines ii) Fitting Curves.

OR

14. B). i) Explain how the Hough Transform is used for detecting lines and shapes in images. 5M
ii) Identify the Camera Parameters and the make use of Perspective Projection. 5M

(P.T.O..)

15. A). i) What are potential fields in robot navigation? Explain one advantage and one drawback. 5M

ii) Describe the subsumption architecture and how it supports layered behaviors in reactive robots. 5M

OR

15. B). i) Define the frame problem in robotics and explain why it is significant. 5M

ii) Explain the function of proximity sensors and give two examples of where they are used in reactive robots. 5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	**B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name	:	**Social Network Analysis**
Course Code	:	**A473417**
Branch	:	**AIM**
Date & Session	:	**22-12-2025 AN** **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.	Write any two applications of social network analysis.	1 M
2.	Mention any two new technologies of collaboration.	1 M
3.	What is the importance of labeling in network visualization?	1 M
4.	Define network metrics.	1 M
5.	What is meant by mapping message boards?	1 M
6.	What is the importance of email communication in modern networks?	1 M
7.	What is Facebook Network Visualization?	1 M
8.	What is the main purpose of interpreting Facebook networks?	1 M
9.	What are WikiNetworks?	1 M
10.	What is meant by content interaction patterns?	1 M

PART-B

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

11.A).	Explain the concept of social media and its importance in modern communication.	10M
	OR	
11. B).	Discuss the evolution of new technologies of collaboration with suitable examples.	10M
12. A).	Describe how to visualize and calculate network metrics using NodeXL.	10M
	OR	
12. B).	Explain the functions and features of NodeXL in Social Network Analysis.	10M
13. A).	Analyze the role of email as the lifeblood of modern communication.	10M
	OR	
13. B).	Explain how threaded networks are mapped and analyzed.	10M
14. A).	Compare and contrast Facebook network analysis with traditional network models.	10M
	OR	
14. B).	Explain the process of visualizing and interpreting Facebook networks.	10M
15. A).	Analyze how YouTube and WikiNetworks contribute to social collaboration and learning.	10M
	OR	
15. B).	Discuss the contrasting patterns of content interaction and prominence on YouTube.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Automata Theory and Compiler Design**
Course Code : **A467307**
Branch : **CSD**
Date & Session : **09-12-2025 AN** **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 an alphabet in the context of automata theory. 1 M
2. What is the significance of ε-transitions in NFA? 1 M
3. List two applications of regular expressions. 1 M
4. State the pumping lemma for regular languages. 1 M
5. What is the role of the stack in a Pushdown Automaton? 1 M
6. Define an instantaneous description of a Turing Machine. 1 M
7. What is the purpose of input buffering in lexical analysis? 1 M
8. Name two types of LR parsers. 1 M
9. What is three-address code in intermediate-code generation? 1 M
10. Define stack allocation in run-time environments. 1 M

PART-B

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

11.A). Explain the process of converting an NFA with ε-transitions to an NFA without ε-transitions, including a step-by-step procedure and an example with a transition diagram. 10M

OR

11. B). Design a DFA that accepts strings over {0,1} where the number of 1's is divisible by 3. Provide the transition table and diagram. 10M

12. A). Construct a regular expression for the language over {a,b} that contains strings with an even number of a's. Show the conversion of the corresponding FA to the regular expression. 10M

OR

12. B). Prove that the language {a^n b^n n ≥ 0} is not regular using the Pumping Lemma. Provide a detailed step-by-step proof. 10M

13. A). Describe the formal definition of a Pushdown Automaton (PDA) and explain how it accepts a language by final state with an example. 10M

OR

13. B). Construct a Turing Machine that accepts the language {a^n b^n n ≥ 1}. Provide the transition function and explain its working for the string "aabb". 10M

(P.T.O..)

14. A). Explain the role of the lexical analyzer in a compiler. Design a transition diagram for recognizing identifiers and keywords in a programming language. 10M

OR

14. B). Compare top-down and bottom-up parsing techniques, highlighting their advantages and limitations with examples. 10M

15. A). Explain the concept of syntax-directed translation and provide an example of a syntax-directed definition for a simple arithmetic expression. 10M

OR

15. B). Describe the structure of three-address code and illustrate its generation for the expression (a + b) * c - d. Include the steps involved. 10M

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H.T No: | | | | | | | | | | | R22

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name : **Deep Learning**
Course Code : **A467306**
Branch : **CSD**
Date & Session : **10-12-2025 AN** **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 is a bias neuron in a feedforward neural network? 1 M
2. What are learning hidden units 1 M
3. What is a dropout layer in a feedforward neural network? 1 M
4. What is multi-task learning? 1 M
5. Define Pooling in CNN 1 M
6. How does padding affect the output size of a convolution operation? 1 M
7. What is RNN 1 M
8. Define Encoder and Decoder sequence 1 M
9. What is Debugging 1 M
10. What is meant by a dictionary in NLP. 1 M

PART-B

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

11.A). Discuss the issue of overfitting in feedforward neural networks and describe some techniques to prevent it. 10M

OR

11. B). Explain the learning principles of XOR using deep feed forward neural network 10M

12. A). Discuss the principles and benefits of semi-supervised learning in deep learning. Provide examples of methods and their applications. 10M

OR

12. B). Explain the concept of parameter norm penalties in deep learning. How do L1 and L2 regularization help in controlling overfitting 10M

13. A). What are the different types of priors and differentiate between strong and weak priors 10M

OR

13. B). Analyze the motivation behind using convolutional networks and their advantages over fully connected networks. 10M

14. A). Explain the significance of the RELU Activation function in Convolution Neural Network. 10M

OR

14. B). What are Echo State Networks (ESNs), how do they differ from traditional RNN and How do you apply in time-series. 10M

15. A). What are the different applications of deep learning and explain it in speech Recognition 10M

OR

15. B). What is semantic segmentation, and how is it different from other computer vision tasks such as image classification and object detection? 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	**B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name	:	**Predictive Analytics**
Course Code	:	**A467308**
Branch	:	**CSD**
Date & Session	:	**19-12-2025 AN** **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.	Which analytics type uses statistical models and machine learning techniques, and why?	1 M
2.	What is meant by measures in a dataset?	1 M
3.	What is the prediction effect in predictive modeling? Give one example of a domain where the prediction effect can be observed.	1 M
4.	Give one ethical concern related to predictive analytics.	1 M
5.	What is the goal of machine learning in prediction tasks? Name any one machine learning algorithm used for prediction	1 M
6.	What is the output of a linear regression model?	1 M
7.	What is meant by the ensemble effect in predictive modeling?	1 M
8.	What is meant by a heterogeneous ensemble in machine learning?	1 M
9.	What is the main purpose of survey analysis?	1 M
10.	What does persuasion by the numbers refer to?	1 M

PART-B

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

11.A).	Explain the different types of analytics — Descriptive, Diagnostic, Predictive, and Prescriptive. Provide real-world examples to support your answer.	10M
	OR	
11. B).	What are the common metrics used to evaluate predictive models? Discuss at least three metrics used for classification and two for regression models with examples.	10M
12. A).	Describe the complete process of deploying a predictive model in a business environment. What are the key challenges faced during deployment, and how can they be addressed?	10M
	OR	
12. B).	Write a detailed note on how organizations can ensure responsible AI and predictive modeling practices by addressing the prediction effect, model deployment lifecycle, ethical concerns, and the data effect as a whole.	10M
13. A).	Explain the concept of Logistic Regression. How is it different from linear regression? Discuss its application in binary classification problems and explain the role of the sigmoid function.	10M
	OR	
13. B).	Define and explain Percent Correct Classification as a metric. How is it calculated, and what are its strengths and limitations when assessing classification models?	10M

(P.T.O..)

14. A). Explain the concept of the wisdom of crowds and its relevance in ensemble learning. What are the key conditions under which this principle leads to better model performance? 10M

OR

14. B). What is Stochastic Gradient Boosting? Explain how it improves upon traditional gradient boosting by introducing randomness. Discuss its benefits and applications. 10M

15. A). Discuss the key steps involved in conducting and analyzing a survey. Explain how survey results can be used for predictive analytics or business decision-making. Include an example to illustrate your answer. 10M

OR

15. B). Discuss the roles of preprocessing, entity recognition, syntactic parsing, and information retrieval in the process of developing a text mining pipeline for question answering. You are building a system that answers user questions based on product reviews. 10M

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H.T No: | | | | | | | | | | | R22

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	**B.Tech VI Semester Supplementary Examinations Nov/Dec-2025**
Course Name	:	**Software Project Management**
Course Code	:	**A467407**
Branch	:	**CSD**
Date & Session	:	**13-12-2025 AN** **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 the five basic parameters of software cost models?	1 M
2.	What are the advantages of commercial components?	1 M
3.	Define architecture-first approach.	1 M
4.	How management set artifacts are evaluated?	1 M
5.	What are the four views required by the most real world systems?	1 M
6.	List out seven top – level workflows.	1 M
7.	Define WBS.	1 M
8.	What is pragmatic planning?	1 M
9.	What are the management indicators?	1 M
10.	Define MTBF.	1 M

PART-B

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

11.A).	Explain the waterfall model with a neat sketch and mention five necessary improvements for this approach to work.	10M
	OR	
11. B).	How to improve software processes and Team effectiveness?	10M
12. A).	Explain the principles of conventional software engineering.	10M
	OR	
12. B).	Demonstrate life-cycle phases in detail.	10M
13. A).	Explain the architecture in a technical perspective.	10M
	OR	
13. B).	Briefly discuss major milestones.	10M
14. A).	Explain the iteration planning process in detail.	10M
	OR	
14. B).	Discuss automation building blocks.	10M
15. A).	Explain the pragmatic software metrics.	10M
	OR	
15. B).	Explain Next-Generation cost models.	10M

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