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

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Nature Inspired Computing**
Course Code : **A466306/ A473305**
Branch : **CSM/ AIM**
Date & Session : **19-06-2025 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 hill climbing in evolutionary computing? 1 M
2. Define simulated annealing. 1 M
3. What is an artificial neural network? 1 M
4. Name one learning algorithm used in typical ANNs. 1 M
5. What is swarm robotics? 1 M
6. Define social adaptation of knowledge in swarm intelligence. 1 M
7. What is negative selection in artificial immune systems? 1 M
8. Define clonal selection. 1 M
9. Give one example of a bio-informatics case study using nature-inspired computing. 1 M
10. What is the role of information display in case studies? 1 M

PART-B

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

11.A). Apply genetic algorithm operators to solve a small multi-modal optimization problem. Show one iteration of selection, crossover, and mutation, and explain how each step moves the population toward better solutions. 10M

OR

11. B). Apply tournament selection and roulette-wheel selection to a given population of fitness values. Compare evolutionary computing and evolutionary biology. 10M

12. A). Apply the backpropagation algorithm to a three-layer neural network given a small training set. Show your weight-update calculations and interpret how learning rate influences convergence. 10M

OR

12. B). Develop and solve a simple pattern-classification problem using a two-layer perceptron in Neural Network. Present the decision boundary and discuss how choice of activation function affects performance. 10M

13. A). Compare how exploration–exploitation trade-offs are managed in particle swarm optimization and in clonal selection algorithms applied to feature selection. 10M

OR

13. B). Analyse and compare the pheromone evaporation and reinforcement mechanisms in ant colony optimization versus direct communication in swarm robotics for path-planning tasks. 10M

(P.T.O..)

14. A). Explain the concept of social adaptation of knowledge in swarm intelligence and illustrate with one real-world example. 10M

OR

14. B). Describe the negative selection algorithm in artificial immune systems, listing its primary steps. 10M

15. A). Apply an artificial immune network to a small anomaly-detection. Show how detectors evolve over two generations and discuss the impact on detection accuracy. 10M

OR

15. B). Discuss different types of tools for analysis in bioinformatics. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Software Engineering**
Course Code : **A462307**
Branch : **CSC**
Date & Session : **19-06-2025 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 software engineering layers. 1 M
2. List the demerits of waterfall model. 1 M
3. What is feasibility study? 1 M
4. Differentiate between functional requirements and non-functional requirements? 1 M
5. Define software architecture. 1 M
6. List the guidelines for data design. 1 M
7. What is black box Test? 1 M
8. What is meant by smoke testing? 1 M
9. What is meant by software review? 1 M
10. Differentiate between reactive risk and proactive risk strategies. 1 M

PART-B

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

11.A). i) Define software. Explain in detail about software myths. 5M
ii) What is legacy software? Explain briefly its impact in software engineering. 5M

OR

11. B). What is software process? What is need of software process improvement? Discuss capability maturity model integration (CMMI). 10M

12. A). i) Explain how a software requirements document is structured. 5M
ii) State and explain various aspects in requirements validation process. 5M

OR

12. B). i) What are the various tasks in requirements engineering? Illustrate with an example the task of collecting requirements at various steps. 5M
ii) Describe the process of requirements management. 5M

13. A). i) Describe architectural design and interface design elements. 5M
ii) Distinguish between sequence and collaboration diagrams. 5M

OR

13. B). What are the design principles of a good software design? Explain. 10M

(P.T.O..)

14. A). i) Discuss the process of debugging. 5M
ii) Explain about the test strategies for conventional software. 5M

OR

14. B). i) What is software measurement? Explain in detail. 5M
ii) Distinguish between error and failure. Which of the two is detected by testing? Justify. 5M

15. A). Explain the activities of software quality assurance group to assist the software team in achieving high quality. 10M

OR

15. B). Explain the following: 10M
i) Risk identification
ii) ISO 9000 quality standards.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Machine Learning**
Course Code : **A405320**
Branch : **Computer Science & Engineering**
Date & Session : **19-06-2025 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 a perceptron in the context of machine learning. 1 M
2. What is the main objective of concept learning? 1 M
3. List the steps involved in forward propagation within an MLP 1 M
4. What is the role of the activation function in an MLP? 1 M
5. What role does the distance metric play in the k-NN algorithm? 1 M
6. Define Ensemble Learning. 1 M
7. What is the main objective of Dimensionality Reduction in machine learning? 1 M
8. What is the goal of Factor Analysis? 1 M
9. Primary objective of Reinforcement Learning. 1 M
10. Proposal Distribution in the context of MCMC methods. 1 M

PART-B

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

11.A). Apply candid-ate elimination algorithm to a given dataset. Explain how the algorithm narrows down the hypothesis space from a general hypothesis to a maximally specific hypothesis. 10M

Example	*Sky*	*AirTemp*	*Humidity*	*Wind*	*Water*	*Forecast*	*EnjoySport*
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

OR

11. B). Explain the difference between supervised and unsupervised learning and describe situations where each would be appropriate. 10M

12. A). Describe the Radial Basis Function (RBF) network and list its key components. 10M

OR

12. B). Explain how backpropagation updates the weights in an MLP. What role does the learning rate play in this process? 10M

13. A). State and explain K-Means clustering algorithm with the following example. 10M
Points: (2, 10), (2, 5), (5, 4), (5, 8), (7, 5), (6, 4) and k = 2.

OR

13. B). Compare Bagging and Boosting algorithms during training and testing phase. 10M

(P.T.O.)

14. A). Describe the purpose of Locally Linear Embedding (LLE) for dimensionality reduction. 10M

OR

14. B). Explain about Principal Component Analysis. Solve the following problem. 10M
(2, 1), (3, 5), (4, 3), (5, 6), (6, 7) and (7, 8).

15. A). Describe how Markov Random Fields are used to model spatial dependencies. 10M

OR

15. B). Explain about Hidden Markov Model. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	**B.Tech VI Semester Regular Examinations June-2025**
Course Name	:	**Embedded Systems**
Course Code	:	**A412309**
Branch	:	**Information Technology**
Date & Session	:	**19-06-2025 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. Classify embedded system based on complexity and performance. 1 M
2. List the major application areas of embedded system. 1 M
3. What is the role of an Interrupt Service Routine (ISR)? 1 M
4. Name three common types of memory used in microcontroller systems. 1 M
5. What is the function of the ISA bus in embedded systems? 1 M
6. What are the advantages of using serial bus communication over parallel bus communication? 1 M
7. Define the term 'header file' in C programming. 1 M
8. What is a macro, and how is it used in embedded programming? 1 M
9. What is the primary function of process/task management in an embedded OS? 1 M
10. Describe what is meant by 'shared data' in task communication. 1 M

PART-B

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

11.A). i) Explain the differences between embedded software and application software with relevant examples. 5M

ii) Analyze the role of embedded systems in modern consumer electronics, automotive, and healthcare sectors. 5M

OR

11. B). i) Summarize the functions and importance of I/O devices in an embedded system. 5M

ii) What are the key characteristics of embedded systems? Describe each with suitable examples. 5M

12. A). i) Compare Harvard and Von Neumann architecture in the context of embedded system design. 5M

ii) Discuss the memory types in embedded system. 5M

OR

12. B). ii) What is a memory map in embedded systems? Illustrate with an example. 5M

ii) Demonstrate how a microcontroller interfaces with real-world devices such as sensors or LEDs. 5M

(P.T.O..)

13. A). i) Describe role of watchdog timer in embedded systems. 5M

ii) Distinguish between I2C and SPI communication interface. 5M

OR

13. B). Describe the working principle of a Real-Time Clock (RTC) and its importance in embedded systems. 10M

14. A). Explain the role of assembly language in embedded firmware development. How does it differ from high-level programming languages like C? Also describe the basic elements of a C program used in embedded systems. 10M

OR

14. B). Develop an embedded C program to interface and control a seven-segment display using functions and macros. Explain your approach. 10M

15. A). i) What is the function of the I/O subsystem manager in an embedded operating system? 5M

ii) Explain the concept of semaphores and their role in task synchronization in embedded OS. 5M

OR

15. B). Describe the various methods of inter-process communication (IPC) in embedded systems such as signals, message queues, mailboxes, and pipes. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Automata Theory and Compiler Design**
Course Code : **A467307**
Branch : **CSD**
Date & Session : **19-06-2025 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. Mention the components of a finite automaton. 1 M
2. What is ε-transition in an NFA? 1 M
3. Write a regular expression for all strings over {a, b} that end with "ab". 1 M
4. What is the role of production rules in a CFG? 1 M
5. Define acceptance by final state and acceptance by empty stack. 1 M
6. Differentiate between a deterministic and non-deterministic Turing machine. 1 M
7. List out the typical errors detected during lexical analysis. 1 M
8. What is the role of a parser in the compiler? 1 M
9. What are synthesized and inherited attributes? 1 M
10. List out the common forms of intermediate code. 1 M

PART-B

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

11.A). i) Define a DFA formally and explain its working with an example that accepts all strings over {0,1} ending in 011. 5M

ii) Write differences between NFA and DFA. 5M

OR

11. B). i) Prove that DFA and NFA are equivalent in terms of language recognition capability with an example. 5M

ii) Explain NFA with epsilon transition to NFA with example. 5M

12. A). Construct a finite automata equivalent to (0+1)*(00+11)(0+1)* 10M

OR

12. B). i) What is an ambiguous grammar? Check the grammar G having productions $S \rightarrow aB / bA$, $A \rightarrow a / aS / bAA$, $B \rightarrow b / bS / aBB$ is ambiguous or not? 6M

ii) Construct LMD, RMD for the above grammar. 4M

13. A). What is the role of the stack in a Push Down Automata? Design a PDA for the language $L= \{a^n b^{2n} / n>=1\}$. 10M

OR

13. B). Explain in detail the properties of recursive, recursively enumerable languages. 10M

14. A). Explain the phases of compiler with an example. 10M

(P.T.O.)

OR

14. B). Show that the following grammar is LR(1) but not SLR(1) 10M
$S \rightarrow L=R,\ S \rightarrow R,\ L \rightarrow *R,\ L \rightarrow id,\ R \rightarrow L$

15. A). What is a three-address code? Generate quadruples, triples and indirect triples for the expression $W = (A + B) - (C + D) + (A + B + C)$. 10M

OR

15. B). Discuss the role of the heap and stack in the run-time environment. How are they managed? 10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30542**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations June-2025

Course Name: Cloud Computing

(CSM)

Date: 19.06.2025 AN **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 are the benefits of High-performance Computing?	2 M
2.	Define the Grid Computing.	2 M
3.	List out five essential characteristics of cloud?	2 M
4.	Define cloud computing and identify its core features?	2 M
5.	Explain about cloud Life Cycle Management Layer?	2 M
6.	What is SLA? What is its role in Cloud Computing?	2 M
7.	Discuss briefly about virtualization.	2 M
8.	What is Resource Pool?	2 M
9.	Elaborate on Google's Cloud storage	2 M
10.	Outline the significance of Amazon Simple Queue Service.	2 M

PART-B

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

11.A).	"Quantum Computers are millions of times faster that most powerful supercomputers today", Justify your answer.	10M
	OR	
11. B).	Explain about mobile computing and its types with suitable examples.	10M
12. A).	Describe the different platforms of cloud architecture in detail.	10M
	OR	
12. B).	Explain the main principles of cloud computing.	10M
13. A).	Elaborate briefly on the security concerns of cloud computing.	10M
	OR	
13. B).	Explain briefly about managing cloud infrastructure and applications.	10M
14. A).	Describe briefly about Iaas.	10M
	OR	
14. B).	Compare and contrast different cloud service models.	10M
15. A).	What is EMC? Explain different modules of EMC's Captiva Cloud Toolkit?	10M
	OR	
15. B).	Explain Google APP engine request handling architecture in detail with a neat diagram.	10M

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H.T No: | | | | | | | | | | | R18 | Course Code: A36710

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech VI Semester Supplementary Examinations June-2025

Course Name: Web & Social Media Analytics

(CSD)

Date: 19.06.2025 AN | **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.	Identify two key functionalities of a decision support system (DSS).	2 M
2.	What is the difference between Business Intelligence and Business Analytics?	2 M
3.	Briefly mention two popular software tool used for Text Mining.	2 M
4.	Distinguish between Text Analytics and Text Mining.	2 M
5.	What is the main objective of Sentiment Analysis	2 M
6.	Describe the main steps involved in the Sentiment Analysis process.	2 M
7.	State the importance of security in web mining applications	2 M
8.	Describe the role of search engines in the context of Web Mining and Web Analytics.	2 M
9.	Identify the primary data sources for conducting social media analytics.	2 M
10.	Describe the purpose of optimization models in prescriptive analytics.	2 M

PART-B

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

11.A).	Explain the concept of Business Intelligence (BI) in detail.	10M
	OR	
11. B).	Discuss the influence of changing business environments on the development and implementation of computerized decision support systems.	10M
12. A).	Summarize the various applications of text mining in different industries.	10M
	OR	
12. B).	Explain the role of natural language processing (NLP) in enhancing text mining techniques.	10M
13. A).	Apply sentiment analysis techniques to analyze customer reviews of a new smartphone model and provide insights into customer satisfaction levels.	10M
	OR	
13. B).	Imagine you are tasked with building a sentiment analysis system to analyze customer reviews for a popular e-commerce platform. Outline the process you would follow, including data collection, preprocessing, feature extraction, model selection, and evaluation.	10M
14. A).	Evaluate the effectiveness of different Web Content Mining and Web Structure Mining techniques in handling dynamic and constantly evolving web content.	10M

(P.T.O..)

OR

14. B). You are a search engine optimization (SEO) specialist working with a travel agency. Apply SEO strategies and techniques to improve the agency's website visibility, rank higher in search engine results for relevant keywords, and drive more organic traffic to their website. 10M

15. A). Discuss the importance of social media analytics in understanding customer behavior and preferences. Provide examples of how businesses utilize these insights. 10M

OR

15. B). Use what-if analysis to assess the financial implications of expanding operations into a new market for a retail chain. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Formal Languages and Automata Theory**
Course Code : **A405313**
Branch : **Computer Science & Engineering**
Date & Session : **21-06-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

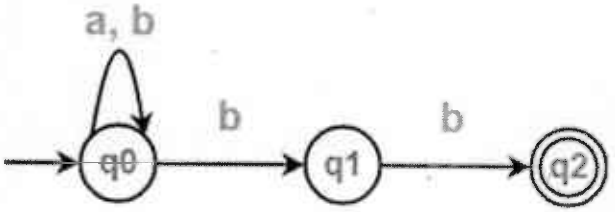
Each question carries ONE mark. **10x1=10M**

1. Define DFA. 1 M
2. Differentiate between DFA and NFA. 1 M
3. Write the closure properties of Regular Language. 1 M
4. Write the algebraic laws for Regular Expression. 1 M
5. Define Context Free Grammar. 1 M
6. Define left-most and right-most derivation. 1 M
7. Write the Production rule for CFG 1 M
8. Define Chomsky normal form. 1 M
9. Mention any two properties of recursive languages. 1 M
10. Define undecidability. 1 M

PART-B

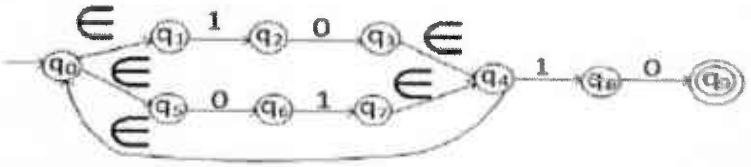
Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Convert the following Non-Deterministic Finite Automata (NFA) to Deterministic Finite Automata (DFA) 10M



OR

11. B). i) Convert the given NFA with ϵ to its equivalent DFA? 5M



ii) What is a Deterministic Finite Automaton? Explain how a DFA processes strings. Construct a DFA to accept all strings over $\Sigma = \{0,1\}$ that contain the substring "101". 5M

(P.T.O..)

12. A). Explain the Pumping Lemma for regular languages. Use it to prove that the language $L=\{w\in\{a,b\}*|w \text{ is a palindrome}\}$ is not regular. 10M

OR

12. B). Minimize the given DFA 10M

Given DFA:
States: Q={A,B,C,D,E,F}
Alphabet: {0,1}
Start: A
Final: {C,E}
Transitions:

State	0	1
A	B	C
B	A	D
C	E	F
D	E	F
E	E	F
F	F	F

13. A). Define PDA and Construct a PDA which recognizes all strings that contain equal number of 0's and 1's. 10M

OR

13. B). Write the process adapted and convert the given PDA into an equivalent CFG. 10M

$\delta(q_0,a_0,z_0)\rightarrow(q_1,z_1z_0)$
$\delta(q_0,b,z_0)\rightarrow(q_1,z_2z_0)$
$\delta(q_1,a,z_1)\rightarrow(q_1, z_1z_1)$
$\delta(q_1,b,z_1)\rightarrow(q_1, \lambda)$
$\delta(q_1,b,z_2)\rightarrow(q_1,z_2z_2)$
$\delta(q_1,a,z_2)\rightarrow(q_1, \lambda)$
$\delta(q_1, \lambda,z_2)\rightarrow(q_1, \lambda)$ // accepted by the empty stack.

14. A). i) Write the process adapted to convert the grammar into CNF? 5M

ii) Convert the following grammar into CNF 5M

G:

- S→aAbB
- A→aA|a
- B→bB|b

OR

14. B). i) Explain Left recursion and Left factoring. 5M

ii) Perform left factor for the grammar 5M

A → xyz | xyw | xya

15. A). i) Explain about Universal Turing machine. 5M

ii) Construct a TM for regular Expression 01(00+11)(0+1)*1. 5M

OR

15. B). Construct a Turing machine which multiplies two unary numbers. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Information Security**
Course Code : **A412310**
Branch : **Information Technology**
Date & Session : **21-06-2025 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 cryptanalysis and cryptography? 1 M
2. Distinguish active and passive attack. 1 M
3. What is the difference between Sub Bytes and Sub Word? 1 M
4. List any three hash algorithm. 1 M
5. What are the properties a digital signature? 1 M
6. State the scenario where Kerberos scheme is preferred. 1 M
7. Define Reply Attack. 1 M
8. What are the function areas of IP security? 1 M
9. List down the four phases of virus. 1 M
10. List the design goals of firewalls. 1 M

PART-B

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

11.A). i) Discuss any four Substitution Technique and list their merits and demerits. 5M
ii) Explain in detail Transposition Technique. 5M

OR

11. B). Write short notes on: 10M
(i) Security attacks
(ii) Security services.

12. A). Briefly explain Deffie Hellman key exchange with an example. 10M

OR

12. B). Explain in detail Hash Functions. 10M

13. A). Discuss about the objectives of HMAC and it security features. 10M

OR

13. B). How does PGP provide confidentiality and authentication service for e-mail and file storage applications? Draw the block diagram and explain its components. 10M

14. A). Explain Secure Electronic transaction with neat diagram. 10M

OR

14. B). Describe the SSL Specific protocol – Handshake action in detail. 10M

15. A). Explain firewalls and how they prevent intrusions 10M

OR

15. B). List and Brief, the different generation of antivirus software. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Vulnerability Assessment and Penetration Testing**
Course Code : **A462308**
Branch : **CSC**
Date & Session : **21-06-2025 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 any two ethical issues in ethical hacking.	1 M
2.	Name any two tools used for penetration testing	1 M
3.	Why is physical security important in cyber security?	1 M
4.	What is Metasploit used for?	1 M
5.	What is the difference between passive and active reconnaissance?	1 M
6.	Define scope in the context of a penetration test.	1 M
7.	Define SQL injection.	1 M
8.	Define the term input validation in web security.	1 M
9.	Define Clickjacking.	1 M
10.	What is browser fingerprinting?	1 M

PART-B

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

11.A).	How does ethical hacking help organizations in securing their systems?	10M
	OR	
11. B).	Write a note on the ethical considerations in penetration testing.	10M
12. A).	Explain any four methods used in physical penetration attacks.	10M
	OR	
12. B).	Discuss the role of access control, auditing, and employee training in preventing insider threats.	10M
13. A).	Discuss the importance of documentation and reporting in penetration testing.	10M
	OR	
13. B).	How do you prioritize vulnerabilities in a pentest report?	10M
14. A).	Explain the OWASP Top 10 web application vulnerabilities in detail with examples.	10M
	OR	
14. B).	How can web applications be protected from sensitive data exposure?	10M
15. A).	Write a detailed note on the role of browser sandboxing, patching, and secure configurations in mitigating exploits.	10M
	OR	
15. B).	What are common techniques used in client-side attacks.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Knowledge Representation and Reasoning**
Course Code : **A466307/ A473306**
Branch : **CSM/ AIM**
Date & Session : **21-06-2025 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 knowledge representation and reasoning? 1 M
2. Differentiate knowing and believing. 1 M
3. What are the Axioms of Mereology? 1 M
4. List the different types of aggregates. 1 M
5. What are the advantages of frames? 1 M
6. What are the different strategies to handle object-oriented system operations? 1 M
7. What are the key concepts of events? 1 M
8. What are the different types of processes? 1 M
9. What are the key characteristics of Vagueness? 1 M
10. List the key characteristics of Randomness. 1 M

PART-B

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

11.A). Discuss the key features of a good logic system. 10M

OR

11. B). What are the components of knowledge representation and reasoning? Why do we need knowledge representation and reasoning in AI? 10M

12. A). Discuss various ontological categories? Why are they important in knowledge representation? 10M

OR

12. B). Differentiate between sets, collections, types, and categories in ontological terms. 10M

13. A). What is knowledge engineering, and what are its key components? What skills and tools are essential for a knowledge engineer? 10M

OR

13. B). Summarize the competence levels of Rodney Brooks and Design Levels of Zachman Framework. 10M

14. A). Define and differentiate between time, events, and situations in knowledge representation. 10M

OR

14. B). What is procedure? List the characteristics of procedure. Discuss the different types of procedures with examples. Discuss the benefits, challenges and applications of concurrent processes. 10M

(P.T.O..)

15. A). What is fuzzy logic, and how does it differ from classical Boolean logic? How does fuzzy logic models degrees of truth in vague concepts? 10M

OR

15. B). What is nonmonotonic logic, and why is it important in knowledge representation? How does nonmonotonic reasoning differ from monotonic reasoning? 10M

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

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Deep Learning**
Course Code : **A467306**
Branch : **CSD**
Date & Session : **21-06-2025 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 motivation for deep learning?	1 M
2.	What are Deep Feed Forward networks?	1 M
3.	List any two classification problems where Data augmentation is used.	1 M
4.	State bagging.	1 M
5.	What are convolutional networks?	1 M
6.	Convolution and pooling are indefinite strong priors. Justify?	1 M
7.	What are Bidirectional Recurrent Neural Networks?	1 M
8.	Give the advantage of recursive nets over recurrent nets.	1 M
9.	Extend Natural language processing.	1 M
10.	List the applications of deep learning.	1 M

PART-B

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

11.A).	i) Develop a supervised learning algorithm and explain in detail.	5M
	ii) Describe the Stochastic Gradient Descent algorithm in detail.	5M
	OR	
11. B).	i) Give an example of learning the XOR function to explain a fully functioning feed-forward network.	5M
	ii) Discuss the architecture design of Deep Feed Forward (DFF) networks.	5M
12. A).	i) What is dataset augmentation in deep learning? Explain.	5M
	ii) Develop a data set and demonstrate Noise Robustness.	5M
	OR	
12. B).	Analyze the challenges in neural network optimization.	10M
13. A).	Write an example function for the Convolution operation and explain in detail.	10M
	OR	
13. B).	Summarize efficient Convolution Algorithms in detail.	10M
14. A).	Develop an example for Unfolding Computational Graphs and describe the major advantages of the unfolding process.	10M
	OR	
14. B).	Explain the Long-Short Term Memory (LSTM) working principles and all the equations?	10M

(P.T.O..)

15. A). What is computer vision? Explain how deep learning techniques are most commonly used for computer vision. 10M

OR

15. B). Explain how deep learning approaches have obtained very high performance on many NLP tasks with a suitable example. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Artificial Intelligence**
Course Code : **A405315**
Branch : **Computer Science & Engineering**
Date & Session : **24-06-2025 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 Artificial Intelligence. 1 M
2. How to Measure the problem-solving performance of an algorithm? 1 M
3. What is Node consistency in Constraint Propagation? 1 M
4. Define Alpha-Beta Pruning. 1 M
5. Translate the following English sentence into first order logic sentence? 1 M
   "No two people have the same social security number"
6. Define Conjunctive Normal Form for first-order logic. 1 M
7. What is meant by PDDL? 1 M
8. What is PlanSAT? 1 M
9. How do you define Approximate Inference in Bayesian Networks? 1 M
10. Define Relational Probability with example. 1 M

PART-B

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

11.A). Briefly explain the four basic types of agent programs that represent the fundamental principles of most intelligent systems? 10M

OR

11. B). Explain how the Hill-Climbing search algorithm works using the 8-Queens problem as an example. Additionally, outline its advantages and disadvantages? 10M

12. A). What is Back Tracking Search? Explain backtracking algorithm for constraint satisfaction problems? 10M

OR

12. B). Prove each of the following assertions: 10M
   i. α is valid if and only if True $\models \alpha$.
   ii. For anyα, False $\models \alpha$.
   iii. $\alpha \models \beta$ if and only if the sentence $(\alpha \Rightarrow \beta)$ is valid.
   iv. $\alpha \equiv \beta$ if and only if the sentence $(\alpha \Leftrightarrow \beta)$ is valid.
   v. $\alpha \models \beta$ if and only if the sentence $(\alpha \wedge \neg\beta)$ is unsatisfiable.

13. A). Illustrate Forword-chaining and backward-chaining algorithms for first-order knowledge bases. 10M

(P.T.O..)

OR

13. B). Discuss about Ontological Engineering for Knowledge Representation. 10M

14. A). i) Describe the differences and similarities between problem solving and planning. 5M
ii) Illustrate the Air cargo transport problem for Classical Planning. 5M

OR

14. B). i) Describe the role of Planning graphs for heuristic estimation. 5M
ii) Write a short note on Hierarchical Planning. 5M

15. A). Discuss about the semantics of Bayesian Networks in detail. 10M

OR

15. B). Discuss different approaches for Efficient Representation of Conditional Distributions. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Scripting Languages**
Course Code : **A412308**
Branch : **Information Technology**
Date & Session : **24-06-2025 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 do you install a gem using Ruby Gems? 1 M
2. What is SOAP? 1 M
3. What is the Jukebox extension in Ruby used for? 1 M
4. What does it mean to embed Ruby in another language? 1 M
5. What operator is used for matching a regex in PERL? 1 M
6. List two characteristics of scripting languages. 1 M
7. What is the syntax to define a multi-dimensional array? 1 M
8. Which function is used to execute shell commands in Perl? 1 M
9. Which command is used for error handling in TCL? 1 M
10. Mention two types of data supported by TCL. 1 M

PART-B

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

11.A). Illustrate with a detailed example how Ruby handles variables, scope, and control structures. 10M

OR

11. B). Describe the MVC architecture of Rails. Write a simple Rails application structure and explain each component. 10M

12. A). i) Describe the process of embedding the Ruby interpreter in a C application. 5M
ii) Compare manual memory management in C with Ruby's garbage-collected environment. 5M

OR

12. B). Describe the concept of Dirty Hand Internet Programming and Security issues. 10M

13. A). Write a PERL script to store and print student data using arrays and hashes. 10M

OR

13. B). Describe the major scripting languages available today, highlighting their unique features and typical use cases. 10M

(P.T.O..)

14. A). i) Explain common security issues in Perl web applications and how to avoid them. 5M

ii) Discuss the advantages and disadvantages of running shell commands from Perl scripts. 5M

OR

14. B). Discuss how pack and unpack are used for efficient data transmission or file I/O. 10M

15. A). i) Explain variable management in TCL. How are scalar and list data types handled? 5M

ii) Discuss how TCL can be used to develop Internet-aware applications. 5M

OR

15. B). Describe Perl-Tk and demonstrate how to create a GUI application using it? 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Network Management Systems and Operations**
Course Code : **A462309**
Branch : **CSC**
Date & Session : **24-06-2025 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 meant by 'managing an entity' in the context of network management? 1 M
2. What is the function of a CSU/DSU in WAN environments? 1 M
3. Differentiate between element management systems (EMS) and network management systems (NMS). 1 M
4. What is meant by 'global consistency' in the context of configuration? 1 M
5. Differentiate between a symptom and a root cause in fault analysis. 1 M
6. What is the 95th percentile in traffic measurement, and why is it important? 1 M
7. Differentiate between perceived security and actual security in a network. 1 M
8. Define Denial of Service (DoS) and mention one strategy to mitigate it. 1 M
9. List any two physical layer testing tools and their uses. 1 M
10. Define a Network Operations Center (NOC). 1 M

PART-B

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

11.A). Explore the concept of **Gartner** model and benefits of automation in network management. What are its enabling technologies and what barriers limit its full adoption? 10M

OR

11. B). Discuss the major network elements typically found in enterprise networks. How does element management simplify their administration? 10M

12. A). Compare and contrast element management systems (EMS) and network management systems (NMS), including their roles in large-scale networks. 10M

OR

12. B). Analyze the relationship between configuration and protocol layering. How can ignoring this relationship lead to configuration errors? 10M

13. A). Discuss the identification causes of fault such as human failure and network faults. 10M

OR

13. B). Compare passive observation and active probing methods. Which is more suitable for real-time monitoring, and why? 10M

(P.T.O.)

14. A). Describe key security terminology such as threat, vulnerability, risk, and mitigation. Provide relevant examples. 10M

OR

14. B). Explain how coordination among security elements and unified firewall design contribute to improved threat defense. 10M

15. A). Discuss the evolution of management tools in networking. How have their capabilities changed over time? 10M

OR

15. B). Evaluate the use of routing and traffic engineering tools in improving network efficiency. Provide a use-case scenario. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Principles of Data Analytics**
Course Code : **A466308/ A473307**
Branch : **CSM/ AIM**
Date & Session : **24-06-2025 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 types of data quality issues. 1 M
2. What does GPS stand for? 1 M
3. Classify a variable in data modeling. 1 M
4. Recall the need for business modeling. 1 M
5. List one assumption of the regression model. 1 M
6. How is variable rationalization useful in regression? 1 M
7. Define overfitting. 1 M
8. Why is accuracy important in time series forecasting? 1 M
9. Name a hierarchical visualization method. 1 M
10. How does geometric projection help in data visualization? 1 M

PART-B

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

11.A). Demonstrate how you would design data architecture and manage data in a real-world analytics project. 10M

OR

11. B). Analyze different sources of data (e.g., signals, sensors, GPS) and discuss the challenges in integrating them. 10M

12. A). Identify a suitable data modeling technique to a business scenario and explain its implementation. 10M

OR

12. B). Compare modeling techniques based on their suitability for structured and unstructured data. 10M

13. A). Illustrate least square estimation to a dataset and derive the regression line. 10M

OR

13. B). Examine Logistic regression with model fit statistics and model construction. 10M

14. A). Make use of supervised learning and how to segment a customer dataset using decision trees? 10M

OR

14. B). Explain STL approach and ARIMA methods in time series forecasting. 10M

(P.T.O..)

15. A). Construct a pixel-oriented visualization for a large dataset and explain the patterns identified. 10M

OR

15. B). Inspect the strengths and weaknesses of icon-based versus hierarchical visualization techniques. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	**B.Tech VI Semester Regular Examinations June-2025**
Course Name	:	**Predictive Analytics**
Course Code	:	**A467308**
Branch	:	**CSD**
Date & Session	:	**24-06-2025 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 any five real-world applications of predictive analytics. 1 M
2. What is a measure in the context of analytics? 1 M
3. What is the prediction effect in data science? 1 M
4. What is data leakage? 1 M
5. What distance metrics can be used in KNN? 1 M
6. What is cross-validation, and why is it used? 1 M
7. What are the advantages and limitations of bagging? 1 M
8. How do ensemble methods perform on noisy vs. clean datasets? 1 M
9. How can Question Answering systems help interpret the outputs of predictive models? 1 M
10. What are some techniques for handling domain-specific jargon in text mining? 1 M

PART-B

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

11.A). Explain how predictive analytics is used in different industries like healthcare, banking, and retail? 10M

OR

11. B). Discuss how accuracy, precision, recall, and F1-score are used to evaluate predictive model performance? 10M

12. A). What infrastructure tools (e.g., Docker, Kubernetes, MLflow) are commonly used for model deployment? 10M

OR

12. B). Describe the impact of biased data on model predictions. 10M

13. A). How is backpropagation used to train a neural network? 10M

OR

13. B). What is multicollinearity, and how can it affect regression analysis? 10M

14. A). How does random forest differ from traditional decision tree models? 10M

OR

14. B). How does stochastic gradient boosting differ from traditional boosting? 10M

15. A). Compare rule-based and machine learning-based QA systems in the context of analytics. 10M

OR

15. B). How can data visualization techniques be used to make predictive results more persuasive? 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Cloud Computing**
Course Code : **A462408**
Branch : **CSC**
Date & Session : **26-06-2025 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. Mention one real-world application of HPC. 1 M
2. What does "on-demand self-service" mean in cloud computing? 1 M
3. List any two essential characteristics of cloud computing. 1 M
4. Define cloud computing. 1 M
5. What are the layers of cloud computing architecture. 1 M
6. What is auto-scaling in cloud infrastructure management? 1 M
7. What is the role of virtualization in IaaS? 1 M
8. Which service model is commonly used in serverless computing? 1 M
9. What is Captiva Cloud Toolkit used for? 1 M
10. What is the main purpose of Google Cloud Connect? 1 M

PART-B

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

11.A). What is grid computing? Explain its components and architecture. 10M

OR

11. B). Explain the applications of bio computing in genetics and medical research. 10M

12. A). Describe the three cloud service models (IaaS, PaaS, SaaS) with suitable examples. 10M

OR

12. B). How does cloud computing serve as a platform for software development and deployment? 10M

13. A). Explain the steps involved in migrating a traditional application to the cloud. 10M

OR

13. B). What are the major applications on cloud? With suitable examples. 10M

14. A). i) Compare the pros and cons of IaaS. 5M
ii) Explain characteristics of PaaS. 5M

OR

14. B). Explain the concept of SaaS with examples. How does it differ from traditional software delivery. 10M

15. A). Explain the role of EMC and EMC IT in enterprise cloud solutions and how they support cloud storage. 10M

OR

15. B). Compare Microsoft Azure with AWS and Google Cloud Platform in terms of services, usability, and enterprise adoption. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Cryptography and Network Security**
Course Code : **A405314**
Branch : **Computer Science & Engineering**
Date & Session : **26-06-2025 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. Distinguish active and passive attacks. 1 M
2. What are the advantages of asymmetric key cryptosystem? 1 M
3. Write the applications of stream ciphers in cryptography. 1 M
4. Formulate knapsack encryption and decryption methods. 1 M
5. List message authentication requirements. 1 M
6. Define kerberos. 1 M
7. What is meant by secure shell? 1 M
8. Why wireless security is required? 1 M
9. Write the functionalities of internet key exchange. 1 M
10. What is the use of single sign-on? 1 M

PART-B

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

11.A). Draw a model for network security cryptography and explain its functionalities. 10M

OR

11. B). Explain different transposition techniques with an example to each. 10M

12. A). Summarize IDEA encryption and decryption methods with a block diagram. 10M

OR

12. B). Illustrate how symmetric key is shared between the sender and receiver using Diffie-Hellman key exchange method with an example? 10M

13. A). Write an algorithm to illustrate Elgamal digital signature scheme with an example. 10M

OR

13. B). Describe kerberos authentication service request response process. 10M

14. A). Outline secure socket layer architecture and its protocols. 10M

OR

14. B). Identify various methods applied for mobile device security. 10M

15. A). Explain how confidentiality and authentication services are incorporated using PGP? 10M

OR

15. B). i) Discuss various security issues arise in virtual elections application. 7M
ii) Explain about cross site scripting vulnerability. 3M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Cloud Computing**
Course Code : **A412311**
Branch : **Information Technology**
Date & Session : **26-06-2025 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 benefit of cloud computing?	1 M
2.	Name a popular cloud service provider.	1 M
3.	Illustrate two key advantages of multicore technology.	1 M
4.	Explain the function of an operating system.	1 M
5.	Name the two primary functions used in MapReduce.	1 M
6.	Which programming language is Cloud Haskell based on?	1 M
7.	Explain one common networking issue in data centers.	1 M
8.	Name a tool used in google cloud provider.	1 M
9.	Name one common threat to cloud security.	1 M
10.	Discuss the role of a firewall in cloud environments.	1 M

PART-B

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

11.A).	Explain the architecture of cloud computing. Illustrate the components of cloud architecture with a neat diagram.	10M
	OR	
11. B).	Compare and contrast different cloud service models: IaaS, PaaS, and SaaS.	10M
12. A).	What is pervasive computing? Discuss its applications, benefits, and security concerns.	10M
	OR	
12. B).	Explain multicore technology. Discuss its advantages and challenges in software development for multicore systems.	10M
13. A).	Discuss the architecture and key features of Cloud Haskell with an example.	10M
	OR	
13. B).	Explain the challenges and best practices in software development using cloud platforms.	10M
14. A).	Illustrate the architecture and key components of a data center environment. What roles do servers, storage, and networking play?	10M
	OR	
14. B).	Explain the role of the transport layer in Data Center Networks (DCNs). What are the major challenges it faces?	10M

(P.T.O..)

15. A). Identify the major security challenges in cloud computing. How can data confidentiality and integrity be ensured? 10M

OR

15. B). Explain the concept of intercloud in cloud computing with its benefits and applications. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Natural Language Processing**
Course Code : **A466309/ A473308/ A467309**
Branch : **CSM/ AIM/ CSD**
Date & Session : **26-06-2025 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 the differences between open class and closed class of words. 1 M
2. List some common issues related to morphological analysis. 1 M
3. In what ways does natural language parsing differ from parsing in programming languages. 1 M
4. What is a treebank, and how is it used in natural language processing? 1 M
5. Define lexical ambiguity. 1 M
6. List some common challenges in parsing multilingual text. 1 M
7. What is meant by the semantics of a natural language, and how does this differs from the pragmatics? 1 M
8. List examples of different meaning representation systems. 1 M
9. What is a variable-length language model? 1 M
10. Define an N-gram. 1 M

PART-B

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

11.A). i) Identify the morphological type (Noun phrase, Verb Phrase, Adjective Phrase) of following sentence segments. 5M

a) Important to Bill b) Looked up the tree

ii) Define the terms related to document structure, such as segmentation, hierarchy, and metadata. 5M

OR

11. B). Compare and contrast the performance of various document structure analysis methods, focusing on rule-based versus machine learning approaches. 10M

12. A). Perform parsing using simple top-down parsing for the sentence "The dogs cried" using the grammar given below: 10M

S→ NP VP
NP→ ART N
NP → ART ADJ N
VP→ V
VP → V NP

OR

12. B). i) Describe the role of grammar-based versus data-driven methods in syntactic parsing. 5M

ii) List the main types of parsing algorithms used in natural language processing and explain at least one algorithm. 5M

(P.T.O..)

13. A). Explain Models for Ambiguity Resolution in parsing. 10M

OR

13. B). What is Word Sense Disambiguation, and why is it important in semantic parsing? Explain any one WSD with an example. 10M

14. A). Compare and contrast different meaning representation systems (e.g., frames vs. semantic roles vs. logical forms). What are the strengths and weaknesses of each? 10M

OR

14. B). Explain the role of predicate-argument structure in capturing the meaning of sentences. With the help of below sentences, identify the predicate and its arguments & illustrate their relationships. 10M

- *The teacher explains the lesson to the students.*
- *She gave a book to her friend.*
- *The chef cooked dinner for the guests.*
- *The cat chased the mouse across the yard.*
- *They celebrated his birthday at a restaurant.*
- *The researcher conducted an experiment in the lab.*

15. A). i) Build a 3-gram language model based on the below text. 6M

"I love pizza so much"

ii) Compare statistical vs. neural language models. 4M

OR

15. B). i) Calculate the perplexity of a language model on the below text. 6M

"We love watching movies"

ii) Explain the benefits of class based language models. 4M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Pattern Recognition**
Course Code : **A466407/ A473407**
Branch : **CSM/ AIM**
Date & Session : **28-06-2025 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 do we classify patterns that have multiple labels? 1 M
2. What are the primary differences between pattern recognition, machine learning, and data mining? 1 M
3. Write the difference between classification and clustering. 1 M
4. Differentiate Supervised learning and Unsupervised learning. 1 M
5. Define overfitting and its drawback. 1 M
6. What are different components of a learning system? 1 M
7. How can we identify the decision planes using support vector machine? 1 M
8. Define a classifier in the context of pattern recognition. 1 M
9. What is soft clustering and hard clustering? 1 M
10. Give criterion function of clustering. 1 M

PART-B

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

11.A). What is pattern classification? What are major paradigms of machine learning? Explain chi-square test in detail. 10M

OR

11. B). Illustrate branch and bound Algorithm with suitable example. Write an algorithm for forward selection with suitable example. 10M

12. A). Define the law of total probability. How the k-nearest neighbor method works? Explain with KNN estimation and KNN rule. 10M

OR

12. B). Prove that a Bayes classifier is equivalent to a minimum distance classifier, assuming that the feature vector is Gaussian. 10M

13. A). Explain Hidden Markov model and its role in the classifier design. Explain the problem of "overfitting" in decision tree. How can this problem be overcome? 10M

OR

13. B). Illustrate the concept of a decision tree with the help of an example. How is a Hidden Markov Model different from a Markov model? 10M

(P.T.O.)

14. A). Formulate SVM as an optimization problem. How support vector machines can be used for classification of data which are not linearly separable? 10M

OR

14. B). What is meant by Linear Discriminant Function (LDF)? Explain least squares for classification. 10M

15. A). Differentiate between Hierarchical and Partitional clustering algorithms. 10M

OR

15. B). Apply K-means clustering algorithm on given data for K=3. 10M
Use C1(2), C2(16), C3(38) as initial cluster centres.
Data : 2,4,6,3,31,12,15,16,38,35,14,21,23,25,30.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Software Testing Methodologies**
Course Code : **A466405/ A473405**
Branch : **CSM/ AIM**
Date & Session : **28-06-2025 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. State phase-1 thinking in software testing. 1 M
2. Give two examples for structural bugs. 1 M
3. List any two data flow bugs. 1 M
4. What is nonlinear boundary? Give one example. 1 M
5. Define path expression. 1 M
6. State distributive laws. 1 M
7. List any two differences between good state graph and bad state graph. 1 M
8. Define dead state. 1 M
9. Define Graph matrix. 1 M
10. Define Asymmetric relation. 1 M

PART-B

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

11.A). i) Draw and explain the components of model for testing. 5M
ii) How to apply model for testing? Illustrate with an example. 5M

OR

11. B). The consequences of a bug can be measured in terms of human rather than machine. Justify the statement with examples. 10M

12. A). i) Define Transaction flow testing. 2M
ii) Illustrate with an example, the transaction flow testing process. 8M

OR

12. B). i) Illustrate with an example, All-predicate-uses (APU) strategy. 5M
ii) Describe about testing one dimensional and two dimensional domains? 5M

13. A). i) Explain about node reduction method. 4M
ii) How to find mean processing time of a routine using node reduction algorithm. 6M

OR

13. B). i) What are KV charts? List the Specification of KV charts. 5M
ii) Explain sum of product form and product of sum form. 5M

(P.T.O.)

14. A). i) List the principles of state testing. Discuss advantages and disadvantages. 5M

ii) Explain about Transition bugs, Dead States. 5M

OR

14. B). i) With a suitable example, explain good state graphs and Bad state graphs. 5M

ii) How to convert specification into a state graph? Give an example. 5M

15. A). Explain with a suitable example, node reduction algorithm. 10M

OR

15. B). i) Write about loops in matrix representation. 5M

ii) Explain the process of linked list representation of a graph matrix. 5M

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

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Advanced Operating Systems**
Course Code : **A412406**
Branch : **Information Technology**
Date & Session : **28-06-2025 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 distributed system?	1 M
2.	What is a communication primitive?	1 M
3.	List two types of mutual exclusion algorithms.	1 M
4.	Define Maekawa's Algorithm	1 M
5.	Explain how deadlocks will occur.	1 M
6.	Outline the idea behind centralized deadlock detection.	1 M
7.	List any two major advantages of multiprocessor systems.	1 M
8.	What are the design challenges in a multiprocessor OS?	1 M
9.	Explain distributed scheduling.	1 M
10.	Define Memory Coherence.	1 M

PART-B

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

11.A).	Describe the major types of distributed system architectures with examples.	10M
	OR	
11. B).	Explain in detail about Inherent Limitations of a Distributed System.	10M
12. A).	Discuss in detail about the Ricart-Agrawala Algorithm	10M
	OR	
12. B).	Analyze the performance of Singhal's Heuristic algorithm explain it briefly.	10M
13. A).	Justify what are the different Deadlock Handling Strategies in Distributed Systems.	10M
	OR	
13. B).	Explain the different control organizations used for distributed deadlock detection.	10M
14. A).	Identify the role of thread in operating system and explain about different types of threads.	10M
	OR	
14. B).	Explain the mechanisms for building distributed file systems and its design issues.	10M
15. A).	What are the major issues in task migration in distributed systems? Discuss with examples.	10M
	OR	
15. B).	Give the advantages of distributed shared memory by explaining its architecture.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Compiler Design**
Course Code : **A405317/ A462310**
Branch : **CSE/ CSC**
Date & Session : **28-06-2025 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 data structure is used to speed up input buffering in lexical analysis? 1 M
2. Write a regular expression for a language containing strings which end with "abb" over Σ= {a,b}. 1 M
3. Which parser is the most powerful among SLR, LALR, and LR(1)? Why? 1 M
4. What is the difference between a top-down and a bottom-up parser? 1 M
5. What does an SDD (Syntax-Directed Definition) associate with grammar productions? 1 M
6. What is the general form of a three-address code statement? 1 M
7. What is the purpose of garbage collection in memory management? 1 M
8. What is a basic block in code generation? 1 M
9. What is the primary goal of code optimization in a compiler? 1 M
10. What is a basic requirement for performing data-flow analysis? 1 M

PART-B

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

11.A). Given a set of regular expressions for a simple programming language, demonstrate how to construct a lexical analyzer to recognize identifiers, keywords, and numbers. 10M

OR

11. B). Explain input buffering in lexical analysis and describe how the use of sentinels improves its efficiency. 10M

12. A). Show the following Grammar: S-> AaAb|BbBa A-> € B-> € Is LL(1) and parse the input string "ba". 10M

OR

12. B). Consider the following grammar: E → E+T|T T → TF|F F → F*|a|b. Construct the SLR parsing table and also parse the input "a*b+a" 10M

13. A). Explain the difference between synthesized and inherited attributes with suitable examples. 10M

OR

13. B). Convert the given arithmetic expression a + b * (c - d) into three-address code. 10M

(P.T.O.)

14. A). Explain the stack allocation strategy for procedure calls. How are local and nonlocal variables accessed using activation records? 10M

OR

14. B). Explain how a flow graph is constructed from intermediate code. 10M

15. A). Explain the principal sources of optimization in compilers. Discuss at least three common optimization strategies with examples. 10M

OR

15. B). Consider the following program code: 10M

```
Prod=0; I=1;
Do
{
Prod=prod+a[i]*b[i];
=i+1; }
while (i<=10);
```

Partition it into blocks and construct the flow graph.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Computer Vision and Robotics**
Course Code : **A466408/ A473408**
Branch : **CSM/ AIM**
Date & Session : **28-06-2025 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 pinhole camera and how does it form an image? 1 M
2. How do shadows help in understanding scene geometry? 1 M
3. What is the significance of the Fourier Transform in image analysis? 1 M
4. How can texture help in estimating the shape of objects in images? 1 M
5. What is binocular fusion in human vision? 1 M
6. Give an example of an application that uses multiple-view geometry. 1 M
7. What is the difference between fitting lines and fitting curves? 1 M
8. How does the linear approach to camera calibration work? 1 M
9. What are two major social implications of robotics in the workplace? 1 M
10. Name two types of pro-perceptive sensors. 1 M

PART-B

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

11.A). Explain the basic principles of radiometry. How are light in space and light on surfaces different? 10M

OR

11. B). Illustrate how surface color can be estimated from image color. What challenges arise in this process? 10M

12. A). Explain the impact of noise on edge detection and the techniques used to reduce noise before estimating derivatives. 10M

OR

12. B). Discuss the method of texture synthesis by sampling local models. How does it help in generating realistic textures? 10M

13. A). How can multiple cameras improve depth estimation and scene reconstruction? Explain with examples. 10M

OR

13. B). Describe segmentation by graph-theoretic clustering. Compare and contrast it with other segmentation methods. 10M

(P.T.O..)

14. A). Explain the purpose and process of geometric camera calibration. What are the key steps involved? 10M

OR

14. B). Describe the application of geometric camera calibration in mobile robot localization. Why is accurate calibration critical? 10M

15. A). What is the closed world assumption and how does it relate to the frame problem in robotic reasoning? 10M

OR

15. B). Compare and contrast topological and metric path planning methods with suitable examples. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	**B.Tech VI Semester Regular Examinations June-2025**
Course Name	:	**Software Project Management**
Course Code	:	**A467407**
Branch	:	**CSD**
Date & Session	:	**28-06-2025 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 waterfall model in conventional software management? 1 M
2. Write the role of peer inspections in software management? 1 M
3. Explain two main stages in the software lifecycle? 1 M
4. Define 'artifact' in the context of software management. 1 M
5. What is a major milestone in a software project? 1 M
6. What is the technical perspective concerned with in software architecture? 1 M
7. Mention the purpose of a Work Breakdown Structure? 1 M
8. List the two key differences between business organizations and project organizations. 1 M
9. Define quality indicator in software project management? 1 M
10. Write the function of metrics automation? 1 M

PART-B

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

11.A). Discuss the evolution of software economics and explain how it has influenced modern software engineering practices. 10M

OR

11. B). Illustrate the importance of pragmatic cost estimation in project planning and execution. 10M

12. A). Describe the engineering and production stages of the software lifecycle. Provide real-world examples. 10M

OR

12. B). How do lifecycle phases and artifact set work together to ensure the success of a software project? Discuss with examples. 10M

13. A). Explain various checkpoints in a software management process. How do they ensure project control and quality? 10M

OR

13. B). Illustrate how periodic status assessments are conducted and how they help in managing software projects effectively. 10M

(P.T.O.)

14. A). Describe Work Breakdown Structures (WBS) and their role in project planning. Provide an example. 10M

OR

14. B). Outline the process automation concept and explain the role of automation building blocks in improving efficiency. 10M

15. A). Demonstrate the concept of life cycle expectations in software projects. Why are they critical for project planning and control? 10M

OR

15. B). Write a detailed analysis of the CCPDS-R case study. Highlight the challenges, solutions, and lessons learned. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations July-2025**
Course Name : **Software Process & Project Management**
Course Code : **A412420**
Branch : **Information Technology**
Date & Session : **01-07-2025 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 initial process	1 M
2.	What is PCCM	1 M
3.	Define Artifact sets.	1 M
4.	Differentiate Meta process and Micro Process	1 M
5.	Write about major milestones in software process.	1 M
6.	Define Work Breakdown Structure.	1 M
7.	Write about evolution of organizations.	1 M
8.	Write a notes on metrics automation	1 M
9.	What is the use of continuous integration in modern project management	1 M
10.	What is the formula for cost	1 M

PART-B

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

11.A).	Compare and contrast between TSP and PSP.	10M
	OR	
11. B).	Explain the reasons for software standards in the defined process.	10M
12. A).	Explain how software economics can be improved.	10M
	OR	
12. B).	Explain Software Life Cycle phases.	10M
13. A).	In an iterative model, the major milestones are used to achieve concurrence among all stake holders on the current state of the project. Discuss concerns of various stakeholders.	10M
	OR	
13. B).	Explain about the iteration planning process and pragmatic planning.	10M
14. A).	List out default roles in the in a software Line of Business Organization	10M
	OR	
14. B).	What are the seven core metrics for process control and instrumentation?	10M
15. A).	List out top 10 Software Management Principles.	10M
	OR	
15. B).	Discuss about next generation software economics.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	**B.Tech VI Semester Regular Examinations June-2025**
Course Name	:	**Cyber Security**
Course Code	:	**A405423**
Branch	:	**Computer Science & Engineering**
Date & Session	:	**01-07-2025 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 different layers of security.	1 M
2.	What is Cyber Espionage?	1 M
3.	What is the role of international law in governing cybercrimes and digital operations?	1 M
4.	Define cyber forensics	1 M
5.	What is meant by authentication service security in mobile devices?	1 M
6.	What are the latest trends in mobility.	1 M
7.	Define social computing.	1 M
8.	What are the security risks of using social media platforms for marketing?	1 M
9.	What is e-mail spoofing?	1 M
10.	Summarize the Parliament Attack.	1 M

PART-B

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

11.A).	(i). What are the primary motives behind cyber-attacks?	5M
	(ii). Write about Vulnerability, threat, Harmful acts	5M
	OR	
11. B).	(i). Explain the key elements of a comprehensive cybersecurity policy	5M
	(ii). How do hardware attacks differ from software attacks	5M
12. A).	(i). Explain the need for cybersecurity regulations in modern digital infrastructure	5M
	(ii). Describe the key features of the National Cyber Security Policy of India	5M
	OR	
12. B).	(i). What are the major challenges faced by forensic investigators?	5M
	(ii). Explain the key stages in the Digital Forensics Lifecycle?	5M
13. A).	(i). Demonstrate the security challenges posed by mobile devices	5M
	(ii). Explain the proliferation of mobile and wireless technologies and its impact on cybersecurity	5M
	OR	
13. B).	(i). Explain the purpose of registry settings in mobile devices.	5M
	(ii). What are the common types of attacks on mobile phones?	5M

(P.T.O.)

14. A).	(i). What are the web threats for organizations in implementing cyber security?	5M
	(ii). What are the organizational challenges associated with social computing	5M
	OR	
14. B).	(i). Discuss security risks and perils for organizations.	5M
	(ii). Describe the Top 10 security risks.	5M
15. A).	Explain briefly about the privacy issues in medical and financial domains.	10M
	OR	
15. B).	(i). What were the key cybersecurity issues in the Indian case of online gambling?	5M
	(ii). What are some common types of financial frauds in the cyber domain	5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Exploratory Data Analysis**
Course Code : **A467420**
Branch : **CSD**
Date & Session : **01-07-2025 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 key steps in the Epicycle of Analysis process? 1 M
2. How do expectations compare to data in the Epicycle of Analysis? 1 M
3. Name two types of questions discussed in stating and refining a question. 1 M
4. What is a characteristic of a good question in data analysis? 1 M
5. Why is checking packaging important when reading in your data? 1 M
6. What should you always be doing when exploring data? 1 M
7. How are models used as expectations in data exploration? 1 M
8. What is the purpose of stopping criteria in model exploration? 1 M
9. List one goal of Formal Modeling. 1 M
10. What are the key components of a general framework for formal modeling? 1 M

PART-B

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

11.A). Elaborate on the process of applying the Epicycle of Analysis. 10M

OR

11. B). Discuss the importance of setting expectations and collecting information in the Epicycle of Analysis. 10M

12. A). Describe the characteristics of a good question and explain how to translate a question into a data problem. 10M

OR

12. B). How can the Epicycle be applied to stating and refining your question? Explain with an example. 10M

13. A). Explain the steps involved in conducting Exploratory Data Analysis (EDA) from formulating your question to making a plot. 10M

OR

13. B). Discuss the importance of validating data with at least one external source and trying the easy solution first in EDA. 10M

14. A). How do models help in exploring data? Discuss how reacting to data refines our expectations. 10M

OR

14. B). Explain the concept of examining linear relationships and stopping criteria when using models to explore data. 10M

(P.T.O..)

15. A). Describe the general framework of Formal Modeling and discuss Associational Analysis. 10M

OR

15. B). Explain the process of Inference, including identifying the population and describing the sampling process. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Social Network Analysis**
Course Code : **A466417/ A473417**
Branch : **CSM/ AIM**
Date & Session : **01-07-2025 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. State any two technologies used for collaboration in social networks. 1 M
2. What does the term 'hashtag' refer to on social media? 1 M
3. Define a structural hole in a social network. 1 M
4. What type of data can NodeXL import? 1 M
5. List any two benefits of analyzing thread networks in email communications. 1 M
6. What is a direct message (DM) on Twitter? 1 M
7. What tool can be used to visualize Facebook networks? 1 M
8. What is an internal hyperlink? 1 M
9. Define wiki networks 1 M
10. What is monetization on YouTube? 1 M

PART-B

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

11.A). i) Differentiate how social network data representation differs from traditional communication networks by taking an example. 5M
ii) Discuss the role of new technologies in modeling the connections. 5M

OR

11. B). What are the main challenges in regulating content on social media platforms? Suggest potential solutions. 10M

12. A). Explore any three clustering techniques on your sample social dataset and interpret the results using NodeXL. 10M

OR

12. B). Discuss the role of modularity in community detection within networks. 10M

13. A). Explain the step-by-step process of how Twitter can be used to track public sentiment during real time events. 10M

OR

13. B). Examine a case study on email networks for understanding communication patterns by taking sample relations. 10M

14. A). How can centrality measures be used to identify influential users in a Facebook network? 10M

OR

14. B). i) Define hyperlink network visualization with examples. 5M
ii) Discuss how Facebook data helps in community detection. 5M

(P.T.O.)

15. A). i) Discuss the role of YouTube's recommendation algorithm in shaping content interaction and prominence. 5M

ii) Describe the methods used to visualize YouTube networks and interpret the patterns of content interaction. 5M

OR

15. B). Describe any five-centrality metrics with examples by taking a sample of Wiki network data. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations July-2025**
Course Name : **Security Incident & Response Management**
Course Code : **A462419**
Branch : **CSC**
Date & Session : **01-07-2025 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 essential steps involved in pre-incident preparation? 1 M
2. Define 'Investigative Priorities'. 1 M
3. When should an investigator perform a live response? 1 M
4. What is forensic duplication? 1 M
5. How is log data collected from network events? 1 M
6. What methods are used to collect and preserve evidence from database servers? 1 M
7. How can understanding your data improve analysis outcomes? 1 M
8. What role does the Windows Registry play in digital forensics? 1 M
9. What types of data are considered core operating system data in Mac OS X? 1 M
10. How does the structure of the Mac OS X file system affect forensic investigations? 1 M

PART-B

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

11.A). Describe the key components of an IR (Incident Response) management handbook. 10M

OR

11. B). Discuss the steps involved in preparing an organization for incident response. 10M

12. A). What are the key criteria for selecting a live response tool in a forensic investigation? 10M

OR

12. B). Discuss the importance of duplicating enterprise assets. 10M

13. A). Describe the key components and steps involved in setting up a network monitoring system. 10M

OR

13. B). Explain how web server logs can be useful in tracking unauthorized access or attacks. 10M

14. A). What is NTFS and how does it impact file system analysis in Windows? 10M

OR

14. B). Explain the main techniques used in memory forensics. 10M

15. A). Explain the role of web browser in investigations. 10M

OR

15. B). Describe how information extracted from instant messaging applications can aid in an investigation. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	**B.Tech VI Semester Regular Examinations June-2025**
Course Name	:	**Human Computer Interaction**
Course Code	:	**A405417**
Branch	:	**Computer Science & Engineering**
Date & Session	:	**05-07-2025 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. Why is consistency important in user interface design? 1 M
2. Recite the role does simplicity play in UI design. 1 M
3. Explain the factors influence human interaction speeds in HCI. 1 M
4. How does screen navigation affect user experience on a web page? 1 M
5. Describe some common navigation schemes in HCI. 1 M
6. Identify the role of icons in user interfaces. 1 M
7. Describe some core principles that support usability standards. 1 M
8. What are the main phases of the software life cycle in HCI? 1 M
9. Explain the linguistic models. 1 M
10. What is ubiquitous computing. 1 M

PART-B

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

11.A). Articulate the fundamental principles of UI design, and why are they significant in HCI? 10M

OR

11. B). What is the significance of direct manipulation in modern UI design? 10M

12. A). How does the iterative design process improve human-computer interaction? 10M

OR

12. B). Distill the best practices for designing web navigation to support effective information retrieval. 10M

13. A). How do icons contribute to cognitive load in user interfaces. 10M

OR

13. B). Explain the role do colors play in accessibility, and how can designers choose accessible color schemes. 10M

14. A). Illustrate the software life cycle in HCI differ from traditional software development life cycles. 10M

OR

14. B). Summarize the concept of iterative design and prototyping contribute to achieving universal design goals. 10M

15. A). What are the strengths and limitations of linguistic models in improving HCI? 10M

OR

15. B). Describe the potential applications of ubiquitous computing in fields such as healthcare, education, and smart cities. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	**B.Tech VI Semester Regular Examinations July-2025**
Course Name	:	**Cloud Security**
Course Code	:	**A462422**
Branch	:	**CSC**
Date & Session	:	**05-07-2025 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 cloud computing.	1 M
2.	What does CSA stand for?	1 M
3.	List any two goals of cloud security.	1 M
4.	Who is responsible for OS security in IaaS?	1 M
5.	Give an example of an external attack entity.	1 M
6.	Name a security tool used for malware detection in the cloud.	1 M
7.	True or False: Encryption is a security requirement for cloud software.	1 M
8.	Why is data security important in cloud environments?	1 M
9.	Define the identity authentication.	1 M
10.	What is a security vulnerability?	1 M

PART-B

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

11.A).	Explain the three main cloud service models with real-world examples.	10M
	OR	
11. B).	Discuss multi-tenancy and data isolation in cloud security. What are the associated risks and countermeasures?	10M
12. A).	Identify and explain at least five major cloud security issues. Support your answer with relevant examples.	10M
	OR	
12. B).	Describe the various security threats at the network level in cloud computing.	10M
13. A).	Using practical examples, describe how attackers can exploit vulnerabilities in different attack surfaces such as APIs, storage, and virtualization layers.	10M
	OR	
13. B).	Explain VMM attack tools in detail.	10M
14. A).	Analyze the cloud software security requirements in information security.	10M
	OR	
14. B).	Explain briefly about cloud mitigation in data security and storage.	10M
15. A).	Describe the techniques used to ensure secure data storage and secure computation in cloud computing.	10M
	OR	
15. B).	How does access control threats used in security management in the cloud.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Randomized Algorithms**
Course Code : **A466422/ A473422**
Branch : **CSM/ AIM**
Date & Session : **05-07-2025 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 key idea behind a randomized Min-Cut algorithm? 1 M
2. State the Minimax Principle. 1 M
3. What does the basic occupancy problem study in probability? 1 M
4. Define random walk on a graph. 1 M
5. What is the purpose of Freivald's algorithm? 1 M
6. What role does fingerprinting play in pattern matching algorithms? 1 M
7. List out the key operations supported by fundamental data structures. 1 M
8. Name two common algorithms for finding a minimum spanning tree. 1 M
9. Define geometric duality. 1 M
10. What is a trapezoidal decomposition? 1 M

PART-B

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

11.A). Compare and contrast Las Vegas and Monte Carlo algorithms with examples. 10M

OR

11. B). Explain the minimax principle and how it applies in game-theoretic algorithms. 10M

12. A). Describe key properties of Markov chains and give an application in randomized algorithms. 10M

OR

12. B). Illustrate LazySelect algorithm with an example. 10M

13. A). Describe how algebraic techniques determine the existence of a perfect matching in a graph. 10M

OR

13. B). Compare different fingerprinting techniques based on accuracy and efficiency. 10M

14. A). Discuss the structure and operations of a random Treap and its advantages. 10M

OR

14. B). Show that Boolean matrix multiplication for n x n matrices can be performed via integer matrix multiplication in time O(MM(n)). How large are the integer values that arise during this computation? 10M

15. A). Let P_1 and P_2 be two points, and l_1 and l_2 be their respective dual lines. Show that the line l passing through P_1 and P_2 is the dual of the point of intersection of l_1 and l_2. 10M

OR

15. B). Discuss an algorithm for sorting on a PRAM and analyze its time complexity. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Blockchain Technology**
Course Code : **A467423**
Branch : **CSD**
Date & Session : **05-07-2025 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 block in a blockchain?	1 M
2.	Explain the difference between decentralization and distribution in blockchain.	1 M
3.	What is the main cryptocurrency used in the Bitcoin blockchain?	1 M
4.	How does Ethereum differ from the Bitcoin blockchain?	1 M
5.	Why are smart contracts useful in a private blockchain environment?	1 M
6.	Mention any one blockchain platform used in consortium blockchains.	1 M
7.	List any two industries using blockchain applications.	1 M
8.	Explain any one security challenge faced by blockchain systems.	1 M
9.	How is blockchain used in retail industry as per the case study?	1 M
10.	Name any one blockchain-based application in healthcare.	1 M

PART-B

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

11.A).	Explain the key components of a blockchain with a neat diagram.	10M
	OR	
11. B).	Explain the types of Cryptocurrencies and their usages.	10M
12. A).	Develop a use case to show how smart contracts and oracles can be used in agriculture supply chain monitoring.	10M
	OR	
12. B).	List and explain the key features of the Bitcoin blockchain.	10M
13. A).	Compare private, public, and consortium blockchains. Include security, control, and scalability aspects.	10M
	OR	
13. B).	Create a simple model of an e-commerce system using a private blockchain.	10M
14. A).	Explain and analyze the performance, scalability, and regulatory issues in blockchain deployment.	10M
	OR	
14. B).	Apply blockchain technology to improve identity management in banking. Discuss the process.	10M
15. A).	List the blockchain platforms covered in the syllabus and mention one use case for each.	10M
	OR	
15. B).	Discuss the role of blockchain in the energy and utilities sector using the provided case study.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Natural Language Processing**
Course Code : **A412421**
Branch : **Information Technology**
Date & Session : **05-07-2025 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 morphology? 1 M
2. What are inflectional and derivational morphemes? 1 M
3. What is the main goal of syntactic parsing in NLP? 1 M
4. Define constituency parser. 1 M
5. Name one method to resolve ambiguity in parsing. 1 M
6. Define word sense. 1 M
7. What is a predicate in semantic parsing? 1 M
8. Give an example of a common meaning representation system. 1 M
9. What is the main goal of a language model? 1 M
10. Define class-based language modeling. 1 M

PART-B

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

11.A). Explain the components of words and how they contribute to understanding language structure. 10M

OR

11. B). Explain different methods used to find the structure of documents in NLP. 10M

12. A). Explain about parsing algorithms and with examples. 10M

OR

12. B). Explain the shift from rule-based to data-driven approaches in syntactic parsing. 10M

13. A). i) Describe how probabilistic models help in resolving parsing ambiguities. 5M
ii) Discuss the importance of word sense disambiguation in semantic parsing. 5M

OR

13. B). What are the challenges of building syntactic parsers for multiple languages? Explain how can we address them? 10M

14. A). Explain how meaning representation system is important in NLP. 10M

OR

14. B). Describe predicate argument structure. 10M

15. A). Explain Bayesian parameter estimation in language modeling. 10M

OR

15. B). Explain unigrams, bigrams, trigrams with examples. Discuss their strengths and limitations. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Explainable AI**
Course Code : **A4MD213**
Branch : **Minor AIML (CSE, IT & CSD)**
Date & Session : **01-07-2025 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. Illustrate three key reasons why explainability is needed in AI. 1 M
2. Give a brief definition of Explainable AI (XAI). 1 M
3. Outline the key principle behind SHAP in Explainable AI. 1 M
4. Define counterfactual explanations in AI. 1 M
5. List one popular Python library used for implementing XAI techniques. 1 M
6. Define why is it important to evaluate the trade-offs between model performance and explainability. 1 M
7. Illustrate why is human-AI interaction important in decision-making processes. 1 M
8. Summarize what role do regulatory frameworks play in Explainable AI. 1 M
9. List one emerging XAI approach. 1 M
10. What is human-in-the-loop AI. 1 M

PART-B

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

11.A). Identify the Black Box Problem in AI and explain how it affects trust in AI systems. 10M

OR

11. B). List the major challenges and limitations of Explainable AI (XAI). Provide real-world examples. 10M

12. A). Compare and contrast model-agnostic and model-specific explainability methods in AI. 10M

OR

12. B). Explain the significance of interactive visualizations in XAI. Determine how they enhance user understanding? 10M

13. A). Analyze the challenges in balancing model accuracy and explainability in AI systems. 10M

OR

13. B). Identify through a case study where Explainable AI has been used successfully to solve a real-world scenario. 10M

14. A). Inspect the ethical concerns related to algorithmic bias and fairness in Explainable AI. 10M

OR

14. B). Assess how Explainable AI enhance human-AI trust in complex decision-making? Provide examples. 10M

15. A). Examine the advancements in Explainable Reinforcement Learning and its applications. 10M

OR

15. B). Assess the role of human-in-the-loop AI and its impact on explainability. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations July-2025**
Course Name : **Machine Learning**
Course Code : **A4MD203**
Branch : **Minor AIML (CE, EEE, ME, ECE & CSC)**
Date & Session : **01-07-2025 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 a well-posed learning problem.	1 M
2.	What is inductive bias in candidate elimination?	1 M
3.	List any two features of a perceptron.	1 M
4.	Why is back-propagation algorithm considered computationally intensive?	1 M
5.	What is the principle of Maximum Likelihood?	1 M
6.	Compare Naive Bayes and Bayesian Belief Networks.	1 M
7.	Define mutation in Genetic Algorithms.	1 M
8.	What is the role of rewards in Reinforcement Learning?	1 M
9.	Mention one advantage of using PROLOG-EBG in analytical learning.	1 M
10.	Suggest a scenario where combining inductive and analytical learning is useful.	1 M

PART-B

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

11.A).	Demonstrate the working of Candidate Elimination algorithm with an example.	10M
	OR	
11. B).	i) Outline the decision tree learning algorithm.	5M
	ii) Analyze inductive bias in decision tree learning.	5M
12. A).	i) Describe the working of multilayer neural networks.	5M
	ii) Apply back-propagation to solve a classification problem.	5M
	OR	
12. B).	Analyze the role of sampling theory in evaluating learning algorithms.	10M
13. A).	i) Explain the concept of a Bayes optimal classifier and how it selects the best hypothesis.	5M
	ii) Describe how the Naive Bayes classifier works, including the assumptions it makes and how probabilities are computed.	5M
	OR	
13. B).	Discuss EM algorithm and its role in ML.	10M
14. A).	i) Describe the role of hypothesis space search in Genetic Algorithms.	5M
	ii) Explain the concept of parallelizing Genetic Algorithms and its advantages.	5M
	OR	
14. B).	Analyze differences between dynamic programming and reinforcement learning.	10M

(P.T.O.)

15. A). i) Explain the working of PROLOG-EBG. 5M

ii) Apply explanation-based learning to search control. 5M

OR

15. B). i) Justify the role of combining inductive and analytical learning in real-world scenarios. 5M

ii) Design a hybrid model using both learning paradigms for recommendation systems. 5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	**B.Tech VI Semester Regular Examinations June-2025**
Course Name	:	**Data Wrangling and Visualization**
Course Code	:	**A4MD103**
Branch	:	**Minor DS (CSC, CSM & AIM)**
Date & Session	:	**01-07-2025 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 data wrangling. 1 M
2. What are the common file formats used for data import/export in R? 1 M
3. What are the basic data types in R? List with examples? 1 M
4. Mention any two differences between a matrix and a data frame in R. 1 M
5. What is a scatter plot? 1 M
6. Name one library in R used for interactive scatter plots. 1 M
7. Define a dendrogram. 1 M
8. How can missing values affect heat maps? 1 M
9. What is continuous data? 1 M
10. What is the difference between a histogram and a bar chart? 1 M

PART-B

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

11.A). Explain the process of importing data from different file formats using R with examples. 10M

OR

11. B). Explain briefly about scraping HTML Table data with examples. 10M

12. A). Explain the various data structures in R: vector, list, matrix, array, and data frame. Give examples? 10M

OR

12. B). Explain at least five functions in dplyr package with examples. 10M

13. A). Describe the process of creating an interactive scatter plot using R. Include code examples. 10M

OR

13. B). Write an R program to generate a scatter plot using ggplot2. Customize axes, color, and theme. 10M

14. A). Describe the steps to create a dendrogram using R. Include code and interpretation. 10M

OR

14. B). What insights can you derive from a heat map and a dendrogram in a clustering analysis context? Provide an example. 10M

15. A). Describe how to visualize trends in continuous data over time using a line plot. 10M

OR

15. B). Compare histogram and density plot. Explain how each visualizes distribution of continuous data. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations July-2025**
Course Name : **Research Methodologies**
Course Code : **A405318**
Branch : **Honour CSE**
Date & Session : **01-07-2025 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 between qualitative and quantitative research. 1 M
2. Mention the reasons for "Why R&D activities" are less in India. 1 M
3. Write the steps in problem identification. 1 M
4. Explain how Literature survey helps in research progress. 1 M
5. State the sources of primary data. 1 M
6. Define Data Analysis. 1 M
7. What are the features of good design? 1 M
8. Explain the null and alternate hypothesis. 1 M
9. List out the parts of a good report. 1 M
10. Mention the need of plagiarism in research. 1 M

PART-B

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

11.A). Define research. Mention various types of research with examples. 10M

OR

11. B). Explain the criteria for a good research in detail. 10M

12. A). Research problem proceeds for research study. Explain 10M

OR

12. B). Discuss the literature review process. 10M

13. A). Define data. Explain various sources of data collection. 10M

OR

13. B). Discuss the process of data processing. 10M

14. A). Explain induction and deduction. 10M

OR

14. B). Elaborate Type-I and type-II errors in research 10M

15. A). Define business report. Explain various types of business reports. 10M

OR

15. B). Differentiate technical and research report with its significance. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech VI Semester Regular Examinations June-2025**
Course Name : **Internet of Things**
Course Code : **A405407**
Branch : **Honors Programme in CSE**
Date & Session : **05-07-2025 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 the physical design of IoT? 1 M
2. What are deployment templates in IoT systems? 1 M
3. Define M2M communication 1 M
4. What is YANG and how is it used in IoT? 1 M
5. Write any two python data types. 1 M
6. How many various modules available in python? 1 M
7. What is cloud storage model? 1 M
8. What is Django? 1 M
9. How IoT performs air pollution monitoring? 1 M
10. Write any IoT devices which are used in agriculture. 1 M

PART-B

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

11.A). Explain various IoT levels with examples. 10M

OR

11. B). Brief about IoT enabling technologies with examples. 10M

12. A). Brief how IoT system management is used with NETCOZF. 10M

OR

12. B). How SDN and NFV used for IoT? 10M

13. A). Illustrate how OOP concepts are used in IoT system development using Python. 10M

OR

13. B). Explain how exception handling can be done in python. 10M

14. A). Illustrate the various interfaces available on Raspberry Pi. 10M

OR

14. B). Explain how Xively cloud work for IoT. 10M

15. A). Explain the design and implementation of an IoT-based Home Automation System. 10M

OR

15. B). Explain how IoT works for agriculture system. 10M

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