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

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

**Examination** : **B.Tech V Semester Regular Examinations December-2024**
**Course Name** : **Network Security and Cryptography**
**Course Code** : **A462303**
**Branch** : **CSC**
**Date & Session** : **18-12-2024 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 importance of security in information systems? 1 M
2. Define steganography. 1 M
3. What is Blowfish used for? 1 M
4. What is the IDEA algorithm used for? 1 M
5. Differentiate between HMAC and CMAC. 1 M
6. Why is key management essential in cryptography? 1 M
7. Define transport-level security. 1 M
8. Define the concept of a secure wireless LAN. 1 M
9. What is IP Security (IPsec)? 1 M
10. How does PGP enhance email security? 1 M

**PART-B**

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

11.A). Discuss the need for security in networked environments and outline the different security approaches available. 10M

**OR**

11. B). Differentiate between symmetric and asymmetric key cryptography and highlighting the advantages and disadvantages of each. 10M

12. A). Explain the DES algorithm, its structure, and how it ensures secure data transmission. 10M

**OR**

12. B). Describe the Diffie-Hellman Key Exchange Algorithm. Explain its significance in secure key management. 10M

13. A). Explain the working of the Secure Hash Algorithm (SHA-512) and how it generates a secure message digest. 10M

**OR**

13. B). Explain Kerberos Authentication mechanism with suitable diagrams. 10M

14. A). Explain the role of Secure Socket Layer (SSL) and Transport Layer Security (TLS) in securing web communications. 10M

**OR**

14. B). Discuss the IEEE 802.11i security enhancements and how they improve upon previous wireless security protocols. 10M

*(P.T.O..)*

15. A). Provide an overview of IP Security (IPsec) and its significance in network security. 10M

**OR**

15. B). Explain the vulnerabilities of cross-site scripting (XSS) and outline the methods used to prevent XSS attacks. 10M

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

**Examination** : **B.Tech V Sem Regular Examinations December-2024**
**Course Name** : **Formal Languages & Automata Theory**
**Course Code** : **A462306**
**Branch** : **CSC**
**Date & Session** : **20-12-2024 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 ε – closure? 1 M
2. Name elements of finite automata. 1 M
3. State Arden's theorem. 1 M
4. List the closure properties of Regular languages. 1 M
5. Differentiate final state and empty stack acceptance of a PDA. 1 M
6. Define parse tree of a grammar. 1 M
7. Differentiate CNF and GNF. 1 M
8. Define ID of a Turing machine. 1 M
9. List the types of Turing machines. 1 M
10. Differentiate PCP and MPCP. 1 M

**PART-B**

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

11.A). Design a DFA that recognizes set of all strings such that the number of **0**'s is even and the number of **1**'s is a multiple of 3 over the input alphabet $\sum = \{0,1\}$. 10M

**OR**

11. B). Draw NFA without ε-transitions for a given NFA with ε-transition, where q0 and q2 are the initial and final states respectively. 10M

| | a | b | c | ε |
|---|---|---|---|---|
| q0 | {q0} | Φ | Φ | {q1} |
| q1 | Φ | {q1} | Φ | {q2} |
| q2 | Φ | Φ | {q2} | Φ |

12. A). State Pumping lemma for Regular grammars 10M
Prove i) $L=\{a^n b^n / n>1\}$ is not regular
ii) L= {w/w is a palindrome over {0,1}} is not regular

**OR**

12. B). Convert the following DFA to a regular expression. 10M

| → | Q/Σ | 0 | 1 |
|---|---|---|---|
| → | q1 | q2 | q1 |
| | q2 | q2 | q4 |
| | q3 | q4 | q2 |
| | q4* | q4 | q1 |

*(P.T.O..)*

13. A). Derive left and right most derivations for the input string "bbaababa" for the given Grammar. 10M

$S \rightarrow bB / aA$

$A \rightarrow b / bS / aAA$

$B \rightarrow a / aS / bBB$

**OR**

13. B). Construct PDA equivalent to the following CFG 10M

$S \rightarrow 0A$

$A \rightarrow 0ABC \mid 1B \mid 0$

$B \rightarrow 1$

$C \rightarrow 2$

14. A). Explain simplification of Context Free Grammar and simplify the following CFG 10M

S -> AB/AC

A -> aAb/bAa/a/ ε

B -> bbA/aaB/AB/ ε

C -> abCA/aDb

D -> bD/a

**OR**

14. B). Convert the following grammar into GNF. 10M

$A_1 \rightarrow A_2A_3$, $A_2 \rightarrow A_3A_1/b$, $A_3 \rightarrow A_1A_2/a$

15. A). Check whether the post correspondence problem, P = {(I, PPI), (IPP, I) (IS, I) (M, M), (S, SS)} has a match. Give the solution. 10M

**OR**

15. B). Explain the following: 10M

i) Properties of Recursive Languages

ii) Undecidability problem

iii) Counter machine

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

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|---|---|---|
| **Examination** | : | **B.Tech V Sem Regular Examinations December-2024** |
| **Course Name** | : | **Algorithm Design and Analysis** |
| **Course Code** | : | **A462304** |
| **Branch** | : | **CSC** |
| **Date & Session** | : | **23-12-2024 AN** **Duration: 3 hours** **Max. Marks: 60** |

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

**PART-A**

**Answer all TEN questions**

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

1. What is an algorithm? Mention its properties. 1 M
2. Define the worst-case time complexity of merge sort. 1 M
3. What does the find operation do in a disjoint set? 1 M
4. What is the chromatic number of a graph? 1 M
5. List the differences between 'Divide and Conquer' and 'Dynamic Programming' approaches. 1 M
6. List the applications of Dynamic Programming. 1 M
7. Define the greedy choice property in the context of greedy algorithms. 1 M
8. List the different types of binary tree traversals. 1 M
9. What are the searching methods that are commonly used in branch and bound method? 1 M
10. What are the differences between deterministic and nondeterministic algorithms? 1 M

**PART-B**

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

11.A). Explain the key differences between Big-O, Θ and Ω notations. 10M

**OR**

11. B). Given an unsorted array of integers, apply the Divide and Conquer approach to sort the array using Quick Sort. Outline the steps involved and provide the time complexity of Quick Sort. 10M

12. A). Compare and contrast the union by rank and path compression techniques in the union-find algorithm. How do these techniques improve efficiency? 10M

**OR**

12. B). Describe the 8-Queens problem and the constraints involved in finding a solution. 10M

13. A). For the given set of items and knapsack capacity =5kg, find the optimal solution for the 0/1 knapsack problem making use of dynamic programming approach. W = (2,3,4,5) and P= (3, 4,5, 6). 10M

**OR**

13. B). i) Explain the procedure to compute lengths of shortest paths between all pairs of nodes for the given adjacency matrix. 5M

$$\begin{pmatrix} 0 & 6 & 13 \\ 8 & 0 & 4 \\ 5 & \infty & 0 \end{pmatrix}$$

ii) Explain about reliability design with appropriate examples. 5M

*(P.T.O..)*

14. A). Use greedy algorithm to solve the following version of the Fractional Knapsack problem: 10M

- Items:( W:10, P:60), (W:20, P:100), (W:30, P:120)
- Knapsack capacity :50
- Show how you would select the items and calculate the maximum value.

**OR**

14. B). Describe the role of the stack and queue in implementing DFS and BFS, respectively. How do these data structures impact the traversal process? 10M

15. A). Elaborate the importance of bounding function in generating solutions. And also write about different types of bounding functions with an example each. 10M

**OR**

15. B). i) Elucidate the relationship Between NP, NP-Hard, and NP-Complete problems. 5M

ii) Describe the Key Differences Between NP-Hard and NP-Complete Problems. 5M

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

**Examination** : **B.Tech V Sem Regular Examinations December-2024**
**Course Name** : **Cyber Crime Investigation & Digital Forensics**
**Course Code** : **A462305**
**Branch** : **CSC**
**Date & Session** : **26-12-2024 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 digital forensics. 1 M
2. List any two principles of digital forensics. 1 M
3. What is the primary purpose of a digital investigation process model? 1 M
4. State the role of the scientific method in digital investigations. 1 M
5. How can digital evidence serve as an alibi in violent crimes? 1 M
6. Mention any one key step in processing a digital crime scene. 1 M
7. Define cyberstalking. 1 M
8. Identify one key difference between digital evidence on Windows and Unix systems. 1 M
9. What is network forensics? 1 M
10. Name two layers where digital evidence is found in network forensics. 1 M

**PART-B**

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

11.A). Explain the role of computers in crimes and discuss any two challenges of digital evidence. 10M

**OR**

11. B). Describe the principles of digital forensics and their importance in investigations. 10M

12. A). Outline the digital investigation process model and explain its significance. 10M

**OR**

12. B). Discuss the steps involved in handling a digital crime scene. 10M

13. A). How does investigative reconstruction help in solving violent crimes? Illustrate with examples. 10M

**OR**

13. B). Explain the process of collecting and preserving digital evidence at a crime scene. 10M

14. A). Discuss the application of forensic science to computers. Provide examples of evidence from Windows systems. 10M

**OR**

14. B). How can digital forensic techniques identify evidence on Unix systems? 10M

15. A). Explain the basics of network forensics and discuss the collection of evidence from the physical and data link layers. 10M

**OR**

15. B). Illustrate how digital evidence is analyzed on the network and transport layers in forensics. 10M

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

**Examination** : **B.Tech V Sem Regular Examinations December-2024**
**Course Name** : **Cyber Laws**
**Course Code** : **A462404**
**Branch** : **CSC**
**Date & Session** : **28-12-2024 AN** **Duration: 3 hours** **Max. Marks: 60**

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

**PART-A**

**Answer all TEN questions**

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

1. What is the need for cyber law in modern society? 1 M
2. What is the Information Technology Act? 1 M
3. Write short notes on E Governance attribution? 1 M
4. Explain the duty of a subscriber under the IT Act, 2000. 1 M
5. What is phishing? 1 M
6. Define cyber fraud. 1 M
7. Define cloud computing in the context of information technology. 1 M
8. What does ICERT stand for? Explain. 1 M
9. What is the procedure to report a cybercrime in India? 1 M
10. What is cyberstalking? 1 M

**PART-B**

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

11.A). Explain the history and evolution of the Internet and the World Wide Web in detail. 10M

**OR**

11. B). Discuss the role of the Information Technology Act, 2000. 10M

12. A). Explain how the acknowledgement and dispatch of electronic records is done. 10M

**OR**

12. B). Write the differences between the following 10M
i) Penalties and offenses
ii) Digital and electronic signatures

13. A). List and explain Rules issued under It Act 2000. 10M

**OR**

13. B). Differentiate electronic commerce and electronic contracts. 10M

14. A). Explain the role of the Department of Electronics and information Technology in regulating cyber activities. 10M

**OR**

14. B). Describe the objectives and functioning of the Cyber Appellate Tribunal. 10M

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

15. A). Discuss the basic rules for the safe operation of computers and the internet to prevent cybercrimes. 10M

**OR**

15. B). Analyze the impact of the Criminal Law (Amendment) Act, 2013, on combating cybercrime in India. 10M

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

**Examination** : **B.Tech V Sem Regular Examinations December-2024**
**Course Name** : **IoT Security**
**Course Code** : **A462411**
**Branch** : **CSC**
**Date & Session** : **30-12-2024 FN** **Duration: 3 hours** **Max. Marks: 60**

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

**PART-A**

**Answer all TEN questions**

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

| | | |
|---|---|---|
| 1. | Mention the Reasons for the IoT Security. | 1 M |
| 2. | List the applications of IoT. | 1 M |
| 3. | Define IoT and Cyber Physical Systems. | 1 M |
| 4. | Identify the Hash function. | 1 M |
| 5. | Name the need of public key Crypto. | 1 M |
| 6. | Compare the analog and Digital signal. | 1 M |
| 7. | Show the necessity of Tree signature algorithm. | 1 M |
| 8. | List the crypto currencies. | 1 M |
| 9. | Demonstrate the smart contractors. | 1 M |
| 10. | State the Data Analyzing Methods. | 1 M |

**PART-B**

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

| | | |
|---|---|---|
| 11.A). | Discuss the Block Cipher Techniques with an example. | 10M |
| | **OR** | |
| 11. B). | Illustrate the IoT Security Requirements with a Neat Sketch. | 10M |
| 12. A). | Discuss the IoT security with reference to attack and Counter Measurements. | 10M |
| | **OR** | |
| 12. B). | Explain the Consensus algorithm with reference scalability problems. | 10M |
| 13. A). | Analyze the Secure IoT Databases with a real-time example. | 10M |
| | **OR** | |
| 13. B). | Infer the verifiable random functions with a scenario. | 10M |
| 14. A). | Examine Device/User Authentication in IoT networking Protocols. | 10M |
| | **OR** | |
| 14. B). | Outline Data Privacy Networking Function Security Tree Signatures. | 10M |
| 15. A). | Analyze smart contract languages and verification languages. | 10M |
| | **OR** | |
| 15. B). | Elaborate Data trust worthiness in IoT secure IoT in Higher Layers. | 10M |

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

**Examination** : **B.Tech V Sem Regular Examinations Dec-2024/Jan-2025**
**Course Name** : **Web and Database Security**
**Course Code** : **A462414**
**Branch** : **CSC**
**Date & Session** : **08-01-2025 FN** **Duration: 3 hours** **Max. Marks: 60**

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

**PART-A**

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

| | | |
|---|---|---|
| 1. | Define web security. | 1 M |
| 2. | How to identify digital identification? | 1 M |
| 3. | How to identify Antitheft? | 1 M |
| 4. | Define web server security. | 1 M |
| 5. | Distinguish between trust management and trust negotiation. | 1 M |
| 6. | Write different steps in Datawarehouse. | 1 M |
| 7. | Define re-engineering. | 1 M |
| 8. | List the data recovery steps. | 1 M |
| 9. | Write different privacy policies in mobile applications. | 1 M |
| 10. | What do you mean by privacy enhancement? | 1 M |

**PART-B**

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

| | | |
|---|---|---|
| 11.A). | Discuss about web security problems with the help of examples. | 10M |
| | **OR** | |
| 11. B). | Explain working cryptographic system and protocols. | 10M |
| 12. A). | Illustrate Privacy protecting techniques. | 10M |
| | **OR** | |
| 12. B). | Explain about web server and physical security servers. | 10M |
| 13. A). | Discuss about the data base security in access control. | 10M |
| | **OR** | |
| 13. B). | Write short description about Data warehouses in security and OLAP System. | 10M |
| 14. A). | Explain about security and re-engineering for databases. | 10M |
| | **OR** | |
| 14. B). | Illustrate the current issues in Hippocratic databases. | 10M |
| 15. A). | Explain about privacy enhanced location-based access control. | 10M |
| | **OR** | |
| 15. B). | Discuss about privacy policies in a mobile environment. | 10M |

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

**Examination** : **B.Tech V Sem Regular Examinations December-2024**
**Course Name** : **Big Data Analytics**
**Course Code** : **A467302**
**Branch** : **CSD**
**Date & Session** : **20-12-2024 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 "variety" in Big Data? 1 M
2. What is OLAP in relation to data warehousing? 1 M
3. What does HDFS stand for? 1 M
4. What is the default block size in HDFS? 1 M
5. What are benefits of using NOSQL databases. 1 M
6. Which node is responsible for taking the task from the Jobtracker and executing it? 1 M
7. Enlist Core MongoDB operations. 1 M
8. How does MongoDB differ from traditional SQL databases? 1 M
9. What is a vector in R 1 M
10. What are basic data type in R? 1 M

**PART-B**

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

11.A). Why an email is placed in the "unstructured category"? State the difficulties in handling unstructured data. 10M

**OR**

11. B). Why is Big Data Analytics important in modern industries? Discuss its impact on decision-making, customer insights, and operational efficiency with examples. 10M

12. A). What features of Hadoop makes it a preferable choice for commercial applications? 10M

**OR**

12. B). Explain the design and functionality of HDFS. How does it manage large datasets across distributed storage, and what are its key features? 10M

13. A). Explain the architecture of a Hadoop cluster. Discuss the roles of the NameNode, DataNode, and Secondary NameNode in managing data and resources. 10M

**OR**

13. B). What is NoSQL, and how does it differ from traditional relational database systems? Discuss its key characteristics and why it is suited for handling Big Data applications. 10M

14. A). Describe the MongoDB query language (MQL). How are queries constructed and executed? Provide examples of basic and advanced queries using operators such as $match, $group, and $sort. 10M

*(P.T.O..)*

**OR**

14. B). Explain the concept of a document in MongoDB and how it differs from a traditional row in a relational database. Include examples of how MongoDB documents are structured and discuss the benefits of this format in handling unstructured or semi-structured data. 10M

15. A). Describe the use of control structures (such as loops and conditional statements) in R. Provide examples of if, for, and while constructs and explain their importance in programming." 10M

**OR**

15. B). Explain what a data frame is in R and how it is used for data analysis. How can you create, access, and modify a data frame? Provide examples to illustrate your explanation. 10M

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

**Examination** : **B.Tech V Sem Regular Examinations December-2024**
**Course Name** : **Introduction to Data Science Using R**
**Course Code** : **A467304**
**Branch** : **CSD**
**Date & Session** : **26-12-2024 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 science. | 1 M |
| 2. | Identify a real-world problem that could be solved using data science. | 1 M |
| 3. | Explain the difference between quantitative and qualitative data. | 1 M |
| 4. | What are the different types of data? | 1 M |
| 5. | Explain how to create a matrix in R. | 1 M |
| 6. | What is a vector in R? | 1 M |
| 7. | Write a function to calculate the factorial of a number. | 1 M |
| 8. | Explain the concept of a for loop. | 1 M |
| 9. | What is a histogram? | 1 M |
| 10. | Interpret the slope and intercept of a linear regression model. | 1 M |

**PART-B**

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

| | | |
|---|---|---|
| 11.A). | Explain the concept of overfitting in statistical models. | 10M |
| | **OR** | |
| 11. B). | Write a simple R script to perform basic data manipulation and analysis. | 10M |
| 12. A). | Describe the limitations of using mean as a measure of central tendency for skewed data. | 10M |
| | **OR** | |
| 12. B). | Explain the purpose of graphic displays in data analysis. | 10M |
| 13. A). | Define and differentiate between vectors, matrices, arrays, data frames, and lists. | 10M |
| | **OR** | |
| 13. B). | Describe the process of merging and sorting data frames. | 10M |
| 14. A). | Define functions in R and their components. | 10M |
| | **OR** | |
| 14. B). | Explain iterative programming in R. | 10M |
| 15. A). | Assess the validity of statistical inferences based on regression models. | 10M |
| | **OR** | |
| 15. B). | Explain the concept of pie chart, bar chart and box plot. | 10M |

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

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| **Examination** | : | **B.Tech V Sem Regular Examinations December-2024** |
| **Course Name** | : | **Scripting Languages** |
| **Course Code** | : | **CSM-A466410/ CSD-A467411/ AIM-A473410** |
| **Branch** | : | **CSM/ CSD/ AIM** |
| **Date & Session** | : | **30-12-2024 FN** **Duration: 3 hours** **Max. Marks: 60** |

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

**PART-A**

**Answer all TEN questions**

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

| | | |
|---|---|---|
| 1. | What are the different class libraries available in Ruby? | 1 M |
| 2. | What features of Ruby contribute to its reputation as a flexible language? | 1 M |
| 3. | What are the basic steps involved in creating extensions in Ruby? | 1 M |
| 4. | How does the ALLOC_N routine function in Ruby? | 1 M |
| 5. | List the string operators provided by Perl. | 1 M |
| 6. | Write a short note on running and debugging Perl. | 1 M |
| 7. | How does the eval function work in Perl? | 1 M |
| 8. | What is the name of the package manager used in Ruby? | 1 M |
| 9. | Define TCL. | 1 M |
| 10. | List key applications of the regular expression (regex) command in TCL. | 1 M |

**PART-B**

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

| | | |
|---|---|---|
| 11.A). | Create a stopwatch application using Ruby Tk to demonstrate its practical use in real-world scenarios. | 10M |
| | **OR** | |
| 11. B). | How would you implement a SOAP-based web service using Ruby in a practical scenario? | 10M |
| 12. A). | Explain the function of the Ruby Interpreter and the different options it provides. | 10M |
| | **OR** | |
| 12. B). | Explain the concept of the embedded Ruby API and how it is used. | 10M |
| 13. A). | What are the different control structures in Perl? Explain with an example in Perl. | 10M |
| | **OR** | |
| 13. B). | Explain various built-in operators and pattern matching modifiers in Perl. | 10M |
| 14. A). | Explain the concept of Dirty Hands Internet Programming. | 10M |
| | **OR** | |
| 14. B). | Write a program that concatenates the variables $firststring and $secondstring, ensuring that the two strings are separated by a single space. | 10M |
| 15. A). | Explain briefly about the TCL structure in detail. | 10M |
| | **OR** | |
| 15. B). | Create a TCL application for locating a file by its name. | 10M |

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

**Examination** : **B.Tech V Sem Regular Examinations Dec-2024/Jan-2025**
**Course Name** : **Web and Social Media Analytics**
**Course Code** : **A467415**
**Branch** : **CSD**
**Date & Session** : **08-01-2025 FN** **Duration: 3 hours** **Max. Marks: 60**

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

**PART-A**

**Answer all TEN questions**

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

1. How does prescriptive analytics help in business decision making? 1 M
2. What are some of the major response activities that organizations take? 1 M
3. What is Watson? What is special about it? 1 M
4. List the most popular application areas of text mining. 1 M
5. What is sentiment analysis? How does it relate to text mining? 1 M
6. Define Linguistic approach. 1 M
7. List the main areas of Web mining. 1 M
8. What are the three types of data generated through Web page visits? 1 M
9. How can social network analysis be used in the telecommunications industry? 1 M
10. Select the measures that impact the social media analytics. 1 M

**PART-B**

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

11.A). i) Illustrate the major response activities that organizations take. 5M
ii) List some capabilities of information systems that can facilitate managerial decision making. 5M

**OR**

11. B). Discuss the major components of BI with a relevant example. 10M

12. A). Explain about the DeepQA Architecture with neat diagram. 10M

**OR**

12. B). Make use of the case study of Patent analysis and explain in detail about text mining. 10M

13. A). Elaborate about the steps in Multi-Step Process to Sentiment Analysis. 10M

**OR**

13. B). i) Demonstrate the usage of special lexicons in identification of sentiment polarity. 5M
ii) Explain the acoustic approach to speech analytics. 5M

14. A). i) Identify three application areas for Web mining. Based on your own experiences, comment on their use cases in business settings. 5M
ii) What are the two main cycles in search engines? Describe the steps in each cycle. 5M

**OR**

14. B). i) Choose the most commonly used methods for search engine optimization? 5M
ii) What are commonly used Web analytics metrics? What is the importance of metrics? 5M

*(P.T.O.)*

15. A). i) List and briefly describe the most common social network types. 5M

ii) Compare the differences and commonalities between Web-based social media and traditional/industrial media. 5M

**OR**

15. B). i) Outline about the various social network analysis metrics. 5M

ii) Infer regarding the best practices in social media analytics. 5M

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

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| **Examination** | : | **B.Tech V Sem Regular Examinations December-2024** |
| **Course Name** | : | **Design and Analysis of Algorithms** |
| **Course Code** | : | **CSM-A466302/ AIM-A473301** |
| **Branch** | : | **CSM & AIM** |
| **Date & Session** | : | **20-12-2024 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 time complexity of an algorithm? 1 M
2. Purpose of notations and list out notations. 1 M
3. What is a Union-Find data structure? 1 M
4. What is Hamiltonian circle with example? 1 M
5. What is the role of base cases in Dynamic Programming 1 M
6. Importance of Reliability design. 1 M
7. Can the Greedy method be used for all optimization problems? 1 M
8. What is a "Greedy choice property"? 1 M
9. How does Branch and Bound prune the search space? 1 M
10. What are different strategies of branch and bound? 1 M

**PART-B**

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

11.A). Analyse the time complexity of Divide and Conquer algorithms. How is the time complexity derived, and what are some common examples with different complexities? 10M

**OR**

11. B). Explain the concept of sorting algorithms. Compare and contrast popular sorting algorithms such as QuickSort, MergeSort, and BubbleSort in terms of their time complexity, space complexity, and efficiency. 10M

12. A). What is the role of Disjoint Sets in cycle detection in undirected graphs? Discuss the process and benefits of using Disjoint Sets. 10M

**OR**

12. B). Derive and explain general method of Heapsort. 10M

13. A). Explain Dynamic Programming with an example of OBST. 10M

**OR**

13. B). What is the time complexity of a Dynamic Programming algorithm. Consider the fallowing instance of the 0/1 knapsack problem. 10M
N=6, (p1, p2,p3, p4, p5, p6) = (w1, w2, w3, w4, w5, w6) = (100, 50 20 10, 7, 3 ) and m = 165.

*(P.T.O..)*

14. A). Discuss the Greedy Algorithm for the Minimum Spanning Tree (MST). Explain how Prim's Algorithm and Kruskal's Algorithm work and compare their performance. 10M

**OR**

14. B). List the advantages and disadvantages of the Greedy Method. Provide example of using job sequencing, where the greedy approach yields an optimal solution. 10M

15. A). Explain how the Branch and Bound algorithm can be applied to solve the Traveling Salesman Problem (TSP). Discuss the process of branching, bounding, and pruning in this context. 10M

**OR**

15. B). Explain the concept of NP-completeness. What are NP-hard and NP-complete problems? 10M

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

**Examination** : **B.Tech V Sem Regular Examinations December-2024**
**Course Name** : **Deep Learning**
**Course Code** : **CSM-A466305/ AIM-A473304**
**Branch** : **CSM/ AIM**
**Date & Session** : **26-12-2024 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. Compare supervised and unsupervised learning technique. 1 M
2. What does a gradient descent algorithm do? 1 M
3. Define dropout technique in deep learning optimization. 1 M
4. Define semi-supervised learning technique. 1 M
5. What is pooling in CNN? 1 M
6. What is CNN? Draw its architecture. 1 M
7. What is RNN and Write its applications. 1 M
8. Define Leaky unit for multiple timescales. 1 M
9. How to select hyper-parameter for practical approaches. 1 M
10. What are the applications of speech recognition techniques? 1 M

**PART-B**

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

11.A). Show how unsupervised learning differs from supervised learning, especially in terms of labeled and unlabeled data. *Describe* scenarios where unsupervised learning is applicable. 10M

**OR**

11. B). Design an architecture for a Deep Feedforward Network to solve a specific problem (e.g., image classification). Include the number of layers, units per layer, and type of activation functions you would use. 10M

12. A). Analyze the concept of Dataset Augmentation and provide a detailed explanation, highlighting its benefits, techniques, and applications." 10M

**OR**

12. B). Explain the challenge in neural network optimization technique. 10M

13. A). Construct a table listing various data formats that are compatible with convolutional networks, along with examples. 10M

**OR**

13. B). Write an example function for Convolution operation and explain in detail. 10M

*(P.T.O..)*

14. A). Elaborate on the concept of Bidirectional RNNs and why they are beneficial for processing sequences in both forward and backward directions. 10M

**OR**

14. B). Discuss the issue of long-term dependencies in sequence learning and its impact on model performance. 10M

15. A). Analyze the use of Default Baseline Models in deep learning, highlighting their advantages and limitations in model evaluation. 10M

**OR**

15. B). How is speech recognition technology transforming the automotive industry, particularly in hands-free driving and in-car systems? 10M

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

**Examination** : **B.Tech V Sem Regular Examinations December-2024**
**Course Name** : **Advanced Python Programming**
**Course Code** : **CSM-A466402/ AIM-A473402**
**Branch** : **CSM/ AIM**
**Date & Session** : **28-12-2024 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 syntax and usage of for loop. 1 M
2. How to open a new file in Python? 1 M
3. Create a Numpy array filled with all zeros. 1 M
4. List any three applications of Pandas. 1 M
5. What is SciPy? 1 M
6. Write a Program to Plot a Vertical line in Matplotlib 1 M
7. What are the packages to required to import MYSQL Database. 1 M
8. What is Flask and when to use it? 1 M
9. Define web scrapping and list out libraries for web scrapping. 1 M
10. What the benefits are of using PyQt's layout managers. 1 M

**PART-B**

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

11.A). Explain the need for continue and break statements. Write a program to check whether a number is prime or not. Prompt the user for input. 10M

**OR**

11. B). Discuss the following methods associated with the file object: 10M
i) read() ii) readline() iii) readlines() iv) tell() v) seek() vi) write()

12. A). How do you find the mean, median, and standard deviation of a NumPy array? 10M

**OR**

12. B). Explain How many ways you can access a column and row from a DataFrame in Python? 10M

13. A). Explain the following SciPy modules with examples: 10M
i) scipy.optimize ii) scipy.integrate iii) scipy.interpolate

**OR**

13. B). What types of plots are available in Matplotlib? Explain with examples. 10M

14. A). How to perform CRUD operations on a database table using Python? Give scripts. 10M

**OR**

14. B). Give an example for form validation with Web Forms. 10M

15. A). Write a Python program that creates a GUI with a textbox, Ok button, and Quit button. On clicking Ok, the text entered in the textbox is to be printed in Python shell; on clicking Quit, the program should terminate. 10M

**OR**

15. B). Explain the following PyQt widgets with examples are: 10M
i) Buttons ii) Labels iii) Combo boxes iv) Radio buttons.

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

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| **Examination** | : | **B.Tech V Sem Regular Examinations Dec-2024/Jan-2025** |
| **Course Name** | : | **Expert Systems** |
| **Course Code** | : | **CSM-A466414/ AIM-A473414** |
| **Branch** | : | **CSM/ AIM** |
| **Date & Session** | : | **08-01-2025 FN** **Duration: 3 hours** **Max. Marks: 60** |

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

**PART-A**

**Answer all TEN questions**

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

| | | |
|---|---|---|
| 1. | Write the Primary types of blind search strategies. | 1 M |
| 2. | What is the main difference between blind search and heuristic search? | 1 M |
| 3. | What is backward chaining? | 1 M |
| 4. | What type of inheritance is used in semantic networks to avoid redundancy? | 1 M |
| 5. | What is the role of a knowledge base in an expert system? | 1 M |
| 6. | What does "inference engine" mean in the context of expert systems? | 1 M |
| 7. | List any two system-building aids used in the development of expert systems. | 1 M |
| 8. | Recall knowledge engineering. | 1 M |
| 9. | List the tools for expert systems. | 1 M |
| 10. | Give any two difficulties faced by expert systems. | 1 M |

**PART-B**

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

| | | |
|---|---|---|
| 11.A). | Discuss how alpha-beta pruning enhances the Min-max algorithm and describe its working with an example. | 10M |
| | **OR** | |
| 11. B). | Discuss blind search strategies and their types. Explain the advantages, limitations, and applications of Breadth-First Search (BFS) and Depth-First Search (DFS) as blind search methods. | 10M |
| 12. A). | Explain how knowledge is represented using rules and discuss the components of a rule-based deduction system. | 10M |
| | **OR** | |
| 12. B). | Explain the concept of rule-based deduction systems. Discuss how knowledge is represented in these systems using rules. | 10M |
| 13. A). | Explain the architecture of an expert system with a suitable diagram. Discuss the components and their roles. | 10M |
| | **OR** | |
| 13. B). | Discuss how knowledge is organized in expert systems for efficient problem-solving. | 10M |

*(P.T.O..)*

14. A). Discuss the role of an engineer in building an expert system. 10M

**OR**

14. B). Compare and contrast rule-based and frame-based knowledge representation techniques in the context of expert systems. 10M

15. A). Discuss the maintenance problems associated with expert systems. 10M

**OR**

15. B). Elaborate the challenges of implementing expert systems in critical decision-making areas. 10M

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

**Examination** : **B.Tech V Sem Regular Examinations Dec-2024/Jan-2025**
**Course Name** : **Foundations of Artificial Intelligence**
**Course Code** : **A4MD201**
**Branch** : **Minor Programme in AI&ML**
**Date & Session** : **08-01-2025 FN** **Duration: 3 hours** **Max. Marks: 60**

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

**PART-A**

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

1. What is AI? Write any two applications of AI. 1 M
2. Differentiate between procedural and declarative knowledge. 1 M
3. What is the role of matrix operations in machine learning? 1 M
4. Distinguish between supervised and unsupervised learning. 1 M
5. What is the purpose of the cost function in linear regression? 1 M
6. Define the concept of gradient descent. 1 M
7. How does logistic regression differ from linear regression? 1 M
8. What is the significance of the decision boundary in logistic regression? 1 M
9. What is the primary goal of clustering algorithms? 1 M
10. Name a popular clustering algorithm and its basic principle. 1 M

**PART-B**

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

11.A). Differentiate between computable function and predicate with suitable example. Explain logic programming. 10M

**OR**

11. B). Evaluate the role of knowledge representation in AI systems. Discuss the strengths and weaknesses of different knowledge representation techniques. 10M

12. A). Apply matrix operations to solve a real-world machine learning problem, such as image classification or natural language processing. Explain the steps involved and interpret the results. 10M

**OR**

12. B). Synthesize the concepts of probability theory and statistical inference to explain the underlying principles of machine learning algorithms. Discuss how these concepts are used in model training and evaluation. 10M

13. A). What is linear regression? Explain it with example. Write the application of linear regression. 10M

**OR**

13. B). Evaluate the performance of a linear regression model using appropriate metrics. Discuss the limitations of these metrics and suggest alternative evaluation strategies. 10M

*(P.T.O..)*

14. A). Create a logistic regression model to classify a given dataset. Experiment with different regularization techniques to improve model performance and prevent overfitting. 10M

**OR**

14. B). Evaluate the performance of a logistic regression model using appropriate metrics. Discuss the limitations of these metrics and suggest alternative evaluation strategies. 10M

15. A). Analyze the impact of different distance metrics on the performance of clustering algorithms. Discuss the strengths and weaknesses of common distance metrics. 10M

**OR**

15. B). Synthesize the concepts of clustering and classification to explain the relationship between these two techniques. Discuss potential applications of hybrid approaches that combine clustering and classification. 10M

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

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

**Examination** : **B.Tech V Sem Regular Examinations Dec-2024/Jan-2025**
**Course Name** : **Data Science Using R**
**Course Code** : **A4MD101**
**Branch** : **Minor Programme in Data Science**
**Date & Session** : **08-01-2025 FN** **Duration: 3 hours** **Max. Marks: 60**

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

**PART-A**

**Answer all TEN questions**

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

1. Draw the life cycle of data science. 1 M
2. Indicate the data type in R used to represent categorical data. 1 M
3. Compare a nominal and an ordinal attribute. 1 M
4. Illustrate the way to calculate the standard deviation with an example. 1 M
5. Define vectors. 1 M
6. Execute a list which contains the following values. {"red", "green", {21:23}, {TRUE,FALSE},50.2,1+2i} and print the count of the list. 1 M
7. Write an R program to calculate and print the power of a given base to a given exponent using for loop. 1 M
8. Compile a comprehensive list of R packages, outlining their functionalities and contexts of usage. 1 M
9. Mention the primary benefit of sampling in data reduction. 1 M
10. Identify the factors considered when selecting a data visualization method. 1 M

**PART-B**

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

11.A). Classify and discuss the core components of data science. 10M

**OR**

11. B). Implement an R program to generate the first in terms of a Fibonacci series. 10M

12. A). Elaborate the key concepts of measuring central tendency and discuss how graphical displays are used to visualize these data features. 10M

**OR**

12. B). Discuss the different types of attributes with examples. 10M

13. A). Develop the following vectors in R. a = (5, 10, 15, 20, ..., 160) b = (87, 86, 85, ..., 56) Use vector arithmetic to multiply these vectors and call the result 'd'. 10M
   i. Select subsets of d to identify the following.
   ii. Identify the 19th, 20th, and 21st elements of d.
   iii. List all of the elements of d which are less than 2000.
   iv. Indicate the number of elements of d that are greater than 6000.

**OR**

13. B). Explain the concept of a data frame in R and discuss how to subset, extend, and sort data frames. Provide examples. 10M

*(P.T.O.)*

14. A). Illustrate the implementation of quick sort using recursion. 10M

**OR**

14. B). Explain Iterative programming in R. 10M

15. A). Provide a comprehensive overview of data reduction strategies used in data mining. Explain the various methods and their applications. 10M

**OR**

15. B). Interpret the role of hierarchical visualization techniques in exploring complex data structures with its types and their advantages. 10M

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