CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	B.Tech V Semester Regular Examinations December-2024
Course Name	:	Data Communications and Computer Networks
Course Code	:	A412305
Branch	:	Information Technology
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 are the five basic components of data communication?	1 M
2.	What is a protocol in data communication?	1 M
3.	Name a method commonly used for framing in the data link layer.	1 M
4.	Which error detection method uses a checksum to detect errors?	1 M
5.	What is the purpose of logical addressing in the network layer?	1 M
6.	What is the purpose of unicast routing protocols?	1 M
7.	What is process-to-process delivery in the context of the transport layer?	1 M
8.	Which protocol layer typically handles congestion control?	1 M
9.	What is the main purpose of the Domain Name System (DNS)?	1 M
10.	Which protocol is used to retrieve files from a remote server?	1 M

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

11.A).	Describe the seven layers of the OSI model and the primary functions of each layer. Explain how data is encapsulated as it moves down through the layers during transmission and decapsulated as it moves up the layers during reception.	10M

OR

11.B).	Explain the principles of Asynchronous Transfer Mode (ATM) and Frame Relay. Compare their operational mechanisms and discuss how each is used to manage network traffic in high-speed networks.	10M

12.A).	Discuss the different methods of error detection and correction in data communication, including parity check, Longitudinal Redundancy Check (LRC), Cyclic Redundancy Check (CRC), and Hamming Code. For each method, explain the basic working principles, advantages, and limitations.	10M

OR

12.B).	Explain the High-Level Data Link Control (HDLC) protocol, its structure, and how it facilitates reliable data transfer. Discuss HDLC's different modes of operation (Normal Response Mode, Asynchronous Response Mode, and Asynchronous Balanced Mode) and the specific use cases for each mode.	10M

(P.T.O..)

13. A). Define internetworking and explain its importance in data communication. Describe the key functions of a router in internetworking, including how routers manage data packet forwarding across different networks and maintain routing tables. 10M

OR

13. B). Discuss the challenges of multicast routing and the importance of multicast routing protocols. Explain the differences between Dense Mode and Sparse Mode multicast routing and describe how protocols like PIM-DM (Protocol Independent Multicast - Dense Mode) and PIM-SM (Sparse Mode) operate in multicast environments. 10M

14. A). Describe the structure of a UDP segment, detailing each field in the header and its function. Explain how UDP achieves simplicity and efficiency by omitting certain control mechanisms that are present in TCP. 10M

OR

14. B). Discuss the differences between congestion control and flow control in the transport layer. Explain why both mechanisms are essential for maintaining network performance and provide examples of how TCP implements each. 10M

15. A). Discuss the concept of Domain Name Space. Explain its structure, including the components of a Fully Qualified Domain Name (FQDN), and the difference between domain names, subdomains, and top-level domains (TLDs). 10M

OR

15. B). What is Simple Network Management Protocol (SNMP), and what is its purpose in network management? Describe the components of SNMP, including agents, managers, and the Management Information Base (MIB), and explain how SNMP facilitates monitoring and management of network devices. 10M

*****

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	B.Tech V Sem Regular Examinations December-2024
Course Name	:	Software Engineering
Course Code	:	A412306
Branch	:	Information Technology
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. Define software engineering paradigm.   1 M
2. What do you mean by spiral model?   1 M
3. Mention non-functional requirements on software to be developed.   1 M
4. What is requirements validation?   1 M
5. Define software architecture.   1 M
6. What are the elements of data design?   1 M
7. State the objectives for debugging.   1 M
8. What are the metrics for software quality?   1 M
9. List the processes of risk management.   1 M
10. What is RMMM?   1 M

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

11.A). Explain about i) Waterfall model ii) Spiral process model iii) Agile process model.   10M

OR

11. B). i) Describe various software myths.   5M
ii) Elaborate the challenges of software engineering.   5M

12. A). Explain the ways and means for collecting the software requirements and how are they organized and represented?   10M

OR

12. B). Discuss the importance of software specification of requirements.   10M

13. A). Distinguish Sequence diagrams and Use case diagrams.   10M

OR

13. B). Illustrate a detailed class diagram for library management system.   10M

14. A). i) What is testing? How is it different from debugging?   5M
ii) Compare black-box and white box- testing models.   5M

OR

14. B). Elaborate metrics for process and products in software testing.   10M

15. A). Differentiate Reactive and Proactive risk strategies.   10M

OR

15. B). Describe the role of software reviews in achieving good quality software.   10M

*****

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	B.Tech V Sem Regular Examinations December-2024
Course Name	:	Machine Learning
Course Code	:	IT-A412307/ CSD-A467303/ CSM-A466303/ AIM-A473302
Branch	:	IT/ CSD/ CSM/ AIM
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 kind of problems can Machine Learning solve?	1 M
2.	Compare supervised and unsupervised learning.	1 M
3.	What is curse of dimensionality?	1 M
4.	Illustrate Interpolations and Basis functions.	1 M
5.	Summarize the impact of overfitting in a typical application of decision tree learning?	1 M
6.	Outline k-nearest neighbor learning classification remarks?	1 M
7.	List out Genetic operators.	1 M
8.	What factors contribute to the popularity of genetic algorithm?	1 M
9.	How Reinforcement learning is different from other learning techniques?	1 M
10.	List out Markov chain monte carlo methods.	1 M

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

11.A).	What are the different types of Machine Learning models? Explain in detail.	10M
	OR	
11. B).	Analyze the hypothesis space search in ID3 and candidate elimination algorithm.	10M
12. A).	Explain the back propagation algorithm with suitable example.	10M
	OR	
12. B).	Explain in detail about radial basis function network with example.	10M
13. A).	Consider a dataset with the following characteristics:	10M

- The dataset consists of 10 samples with a binary target variable (either "Yes" or "No").
- The dataset has two features: Feature A and Feature B.
- The data is as follows:

Sample	Feature A	Feature B	Target (Yes/No)
1	1	1	Yes
2	1	1	No
3	1	0	Yes
4	0	1	Yes
5	0	0	No
6	1	1	Yes
7	0	0	Yes
8	1	0	No
9	0	1	No
10	1	0	Yes

i) Calculate the Entropy of the target variable before any split (i.e., for the entire dataset).

ii) Calculate the Information Gain if you split the dataset based on Feature A.

iii) Calculate the Gini Index for the entire dataset and for each possible split (based on Feature A and Feature B).

<div align="center">OR</div>

13. B). Consider the following 2D dataset of points with two features x_1 and x_2 and their corresponding binary class labels y $\in\{0,1\}$: **10M**

Sample	x_1	x_2	Class y
1	1	2	1
2	2	3	1
3	3	3	0
4	6	5	0
5	7	8	1
6	8	7	0
7	4	4	0
8	5	2	1
9	6	4	0
10	7	6	1

Classify the query point Q = (5,5) using the K-Nearest Neighbors algorithm with k=3.

14. A). Analyze Principal Component Analysis with suitable example? **10M**

You are given the following 2D dataset consisting of 5 samples with two features x_1 and x_2 : The goal is to perform Principal Component Analysis (PCA) on this dataset to reduce the dimensionality to 1D.

Sample	x_1	x_2
1	2	3
2	3	3
3	4	5
4	5	7
5	6	8

<div align="center">OR</div>

14. B). Analyze working procedure of Genetic algorithms in detail in evolutionary learning. **10M**

15. A). Explain in detail Reinforcement learning. **10M**

<div align="center">OR</div>

15. B). Explain in detail about hidden markov models. **10M**

<div align="center">*****</div>

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

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	B.Tech V Sem Regular Examinations December-2024
Course Name	:	Automata Theory and Compiler Design
Course Code	:	A412303
Branch	:	Information Technology
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 NDFA giving example.   1 M
2. Explain Operation on Languages.   1 M
3. Give the difference between Left Derivation Tree and Right Derivation Tree.   1 M
4. List the applications of Regular Expressions.   1 M
5. Define PDA giving its model.   1 M
6. Differentiate PCP and MPCP.   1 M
7. Define Cross Compiler. Explain Bootstrapping.   1 M
8. What are the problems associated with Top-Down Parsing?   1 M
9. What is syntax directed translation (SDD)? Give example   1 M
10. List out different object code forms.   1 M

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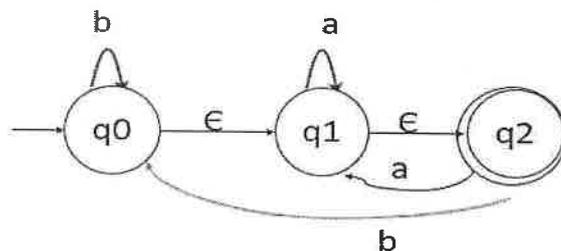**Answer the following. Each question carries TEN Marks.**   5x10=50M

11.A). Consider the below finite automata and check whether the strings are accepted or not.   10M

States	Input Alphabtes	
(Q)	0	1
→q0	q1	q3
q1	q0	q2
(q2)	q3	q1
q3	q2	q0

   (i) 0001   (ii) 1010   (iii) 1001   (iv) 0101

OR

11. B). Convert the following NFA with ε moves to DFA.   10M

(P.T.O..)

12. A). List out the identities of Regular expression.

10M

OR

12. B). From the identities of RE, prove that

i) 10+(1010)*[^+(1010)*]=10+(1010)*

ii) (1+100*)+(1+100*)(0+10*)(0+10*)*=10*(0+10*)*

10M

13. A). Construct an equivalent PDA for the following CFG. S→aAB | bBA

A→bS|a

B→aS|b.

10M

OR

13. B). Construct a TM for regular Expression 01(00+11)(0+1)*1.

10M

14. A). List the Differences between SLR,CLR,LALR parsers

10M

OR

14. B). Consider the grammar   E→TE^1

E^1→+TE^1|-TE^1|ε T→FT^1

T^1→*FT^1|/FT^1|ε F→GG^1

G^F/ε E)/id

Calculate FIRST and FOLLOW for the above grammar.

10M

15. A). Give the evaluation order of SDT with an example.

10M

OR

15. B). Explain Representation of Three Address Codes with suitable Examples.

10M

*****

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	B.Tech V Sem Regular Examinations December-2024	
Course Name	:	Advanced Computer Architecture	
Course Code	:	A412401	
Branch	:	Information Technology	
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. Recall the need of dependance graph in a program. 1 M
2. Outline the PRAM model of a multiprocessor with a shared memory. 1 M
3. Define the term degree of parallelism. 1 M
4. List the parameters for evaluating parallel processing. 1 M
5. Why the anticipatory paging scheme is difficult to implement in hybrid memory system. 1 M
6. Name the factors affecting cache hit ratio in cache design. 1 M
7. Compare unicast with multicast in terms of message passing network. 1 M
8. What is the reason for choosing message passing over address switching in multicomputer. 1 M
9. Name the four categories of intercrosses communication that does the job of high-speed scanning mechanism. 1 M
10. Define the vector processing. 1 M

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

11.A). With the help of a neat diagram, explain the architecture of a vector supercomputer. 10M

OR

11. B). Discuss the five tuples that describe operational model of a SIMD machine with an appropriate example. 10M

12. A). Explain the applicability and the restrictions involved in using Amdahl's law, Gustafson's law, and Sun and Ni's law to estimate the speedup performance of an n-processor system compared with that of a single-processor system. Ignore all communication overheads. 10M

OR

12. B). Distinguish between RISC and CISC processor architecture. 10M

13. A). Outline the concept of memory interleaving and pipelined memory access for memory bandwidth analysis. 10M

OR

13. B). Justify the statement "Dependences and resource conflicts may stall one or two pipelines in a two-issue superscalar processor." 10M

(P.T.O..)

14. A). With an appropriate example, discuss how a snoopy protocol achieves data consistency among caches and shared memory through a bus watching mechanism. 10M

OR

14. B). Illustrate the three early generations of multicomputer that have contributed to the development of modern systems. 10M

15. A). Elaborate the structural and operational differences between register-to-register and memory-to-memory architectures in building multipipe lined supercomputers for vector processing. Comment on the advantages and disadvantages of using SIMD computers as compared with the use of pipelined supercomputers for vector processing. 10M

OR

15. B). i) Explain the architecture of the Connection Machine CM-5. 5M
ii) Discuss SIMD computer organization with the help of suitable example. 5M

*****

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	B.Tech V Sem Regular Examinations December-2024	
Course Name	:	Data Mining	
Course Code	:	IT-A412410/ CSM-A466409/ AIM-A473409	
Branch	:	IT/ CSM/ 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.	Define data mining.	1 M
2.	What is the difference between data cleaning and data integration?	1 M
3.	Define the term "association analysis".	1 M
4.	What is meant by frequent itemset?	1 M
5.	Define the term "classification".	1 M
6.	What is the key difference between supervised and unsupervised learning?	1 M
7.	What does AGNES stand for in hierarchical clustering, and what is its purpose?	1 M
8.	List the key requirements for cluster analysis.	1 M
9.	Write a short note on time series in temporal mining?	1 M
10.	Name any two algorithms commonly used in spatial clustering.	1 M

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

11.A).	i) Explain the process of knowledge discovery in data mining, outlining each step involved.	6M
	ii) Analyze the major issues faced in data mining.	4M

OR

11. B).	Illustrate the key stages in the data preprocessing phase and discuss why it is crucial for data mining.	10M

12. A).	Analyze the FP-growth algorithm and discuss the advantages it has over the Apriori algorithm for large datasets.	10M

OR

12. B).	Describe the key elements and process of market basket analysis and how it supports business decisions.	10M

13. A).	i) Briefly explain the Bayes' theorem.	5M
	ii) Differentiate between decision tree and rule-based classification.	5M

OR

13. B).	Classify the different types of ensemble methods and analyze their effectiveness in improving classifier performance.	10M

(P.T.O..)

14. A). Compare and contrast the partitioning methods k-Means and k-Medoids, analyzing their applications and limitations.   10M

OR

14. B). Examine the types of outliers and illustrate the primary challenges in detecting outliers.   10M

15. A). i) Demonstrate how web usage mining is applied in e-commerce to enhance user experience and personalization.   5M

ii) Outline the key components of spatial data.   5M

OR

15. B). Briefly explain the following: 10M
   i) Temporal mining.
   ii) Web mining.

*****

(Note: Assume suitable data if necessary)

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

1.	Write the user interface importance in HCI.	1 M
2.	How does good design affect user experience?	1 M
3.	Explain the main stages of the HCI design process.	1 M
4.	What is information retrieval?	1 M
5.	Extract some common navigation schemes in HCI.	1 M
6.	What is the role of icons in user interfaces?	1 M
7.	Define prototyping.	1 M
8.	Explain universal design in HCI.	1 M
9.	Recite the purpose of GOMS in HCI.	1 M
10.	Define augmented reality.	1 M

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

11.A).	Illustrate the good design in technology used in society.	10M

OR

11. B).	How has screen design evolved in HCI, and what future trends might we expect?	10M
12. A).	Justify the concept of iterative design process in improving human-computer interaction.	10M

OR

12. B).	Explain the role of information retrieval algorithms play in enhancing user experience on large websites.	10M
13. A).	What are best practices for selecting windows and dialogs to enhance usability?	10M

OR

13. B).	Discuss the challenges arise in designing text and messages for diverse user groups.	10M
14. A).	Explain the benefits and challenges of iterative design and prototyping in HCI.	10M

OR

14. B).	Identify the role of usability standards and guidelines (e.g., ISO 9241) play in the software life cycle of HCI.	10M
15. A).	Articulate the main challenges of designing for display-based systems, and how can these be addressed?	10M

OR

15. B).	Prioritize the advantages and limitations of augmented reality (AR) in HCI applications.	10M

*****