CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	M.Tech I Semester Regular & Supplementary Examinations March-2025
Course Name	:	Advanced Data Structures
Course Code	:	B458302
Branch	:	CSE
Date & Session	:	17-03-2025 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. Construct the Min Heap using 2, 7, 4, 10, 8, and 6.   1 M
2. Define the Leftiest tree.   1 M
3. What is collision in hashing?   1 M
4. Construct a simple hash table with O(1) for any five key values (Ex: vowels).   1 M
5. Draw the example of a 2-3-4 tree.   1 M
6. Justify the need of rotations in AVL tree.   1 M
7. What is a digital search tree?   1 M
8. Define Patricia.   1 M
9. What is Brute force?   1 M
10. What is pattern matching?   1 M

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

11.A). Define Binomial Heap and write the Class definition of a binomial heap.   10M

OR

11. B). Describe the following with suitable example (i) Insertion into a Binomial Heap (ii) Deletion of Min Element.   10M

12. A). Explain the hash functions (i) Mid-Square (ii) Folding with suitable example.   10M

OR

12. B). Define Hash Table. How do you represent Hash Table? Explain.   10M

13. A). Construct an AVL tree for the following list of elements.   10M
(i). Jan, Dec, Nov, Sep, Mar, Feb, Jun, Oct, May, Jul, Apr, Aug
(ii). Red, Blue, Green, Orange, Yellow, Violet, Indigo

OR

13. B). Explain deletion algorithm in Red-Black trees with an example.   10M

14. A). Describe the Binary Trie functions for search and insert operations.   10M

OR

14. B). Draw the multiple string suffix tree for S1 = abba, S2 = bbbb, and S3 = aaaa.   10M

15. A). Describe the Knuth-Morris-Pratt algorithm with suitable example.   10M

OR

15. B). Describe the Rabin Karp with a suitable example.   10M

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Examination	:	M.Tech I Semester Regular & Supplementary Examinations March-2025
Course Name	:	Mathematical Foundations of Computer Science
Course Code	:	B458301
Branch	:	Computer Science & Engineering
Date & Session	:	19.03.2025 AN Duration: 3 hours Max. Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions
Each question carries ONE mark.   10x1=10M

1. Show that $(p \rightarrow r) \wedge (q \rightarrow r)$ and $(p \vee q) \rightarrow r$ are logically equivalent.   1 M
2. Write the negation of the statement $(\exists x)(\forall y)P(x, y)$.   1 M
3. Give the formal definition for the composition of binary relations.   1 M
4. Define lattice and write its properties.   1 M
5. What is Recursion?   1 M
6. What is well ordering?   1 M
7. Define Baye's theorem.   1 M
8. Write any two applications of inclusion and exclusion.   1 M
9. Write about isomorphic graphs.   1 M
10. If G is a k regular graph with 18 edges and the order of the graph is 9. Find the value of k.   1 M

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

11.A). Obtain the principal disjunctive and conjunctive normal forms of $(P \rightarrow(Q \wedge R)) \wedge (\neg P \rightarrow (\neg Q \wedge \neg R))$. Is this formula a tautology?   10M

OR

11. B). Prove or disprove the validity of the following arguments using the rules of inference. (i) All men are fallible (ii) All kings are men (iii) Therefore, all kings are fallible.   10M

12. A). Define Relation. List out the Properties of Binary operations.   10M

OR

12. B). Let X = {a,b,c,d,e} and let C = {{a,b},{c},{d,e}}. Show that the partition C defines an equivalence and compatibility relation on X.   10M

13. A). Explain briefly about The Growth functions with example.   10M

OR

13. B). Suppose that f(n) = n*f(n-1) with f(1) = 1. Prove by induction that f(n) = n*(n-1)...3*2*1.   10M

14. A). Briefly discuss Divide-and-Conquer Algorithm.   10M

OR

14. B). Solve the recurrence relation using generating function. $U_{n+2} - 2u_{n+1} + u_n = 2^n$, $u_0 = 2$, $u_1 = 1$.   10M

15. A). Explain Isomorphic graphs with example.   10M

OR

15. B) Define Spanning tree. Any connected Graph with n vertices and (n-1) degrees in a tree.   10M

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Examination	:	M.Tech I Semester Regular & Supplementary Examinations March-2025
Course Name	:	Deep Learning
Course Code	:	B458402
Branch	:	Computer Science & Engineering
Date & Session	:	21.03.2025 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 gradient descent, and how is it used in training neural networks?	1 M
2.	Name one heuristic method used to speed up the training of neural networks.	1 M
3.	State the purpose of pooling layers in a CNN.	1 M
4.	In what way do dynamic memory networks improve upon standard recurrent neural networks	1 M
5.	Define automated image captioning.	1 M
6.	Outline how can LSTM models be used to convert video to text.	1 M
7.	Define Bag of Words.	1 M
8.	Discuss the purpose of evaluating word similarity in NLP tasks.	1 M
9.	How do Recurrent Neural Networks (RNNs) work for opinion mining?	1 M
10.	Illustrate the challenges exist in dialogue generation using LSTM models.	1 M

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

11.A).	i) Discuss feed forward neural networks in detail.	5M
	ii) Describe Back Propagation algorithm.	5M

OR

11. B).	i) Explain Nesterov's Accelerated Gradient Descent (NAG) and how it improves upon traditional gradient descent methods.	5M
	ii) Discuss L1 Regularization (Lasso Regression) methods.	5M

12. A).	i) Explain Convolution operation, with motivation and examples.	5M
	ii) Illustrate Convolution neural network architecture.	5M

OR

12. B).	i) Describe Long Short-Term Memory (LSTM) networks and their advantages over traditional Recurrent Neural Networks (RNNs).	5M
	ii) Discuss auto encoders in detail.	5M

13. A).	i) Explain the process of image segmentation and its significance in computer vision tasks.	5M
	ii) Discuss the application of object detection in autonomous vehicles.	5M

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13. B). i) Summarize how Generative Adversarial Networks (GANs) work to generate realistic images.   5M

ii) Explain how attention mechanisms improve deep learning models for computer vision tasks.   5M

14. A). i) Discuss the advantages and limitations of using pre-trained word embedding's in NLP tasks.   5M

ii) Explain in detail about the applications of NLP in sentiment analysis.   5M

OR

14. B). i) Explain the Continuous Skip-Gram model and how it is used to learn word embedding.   5M

ii) What is GloVe (Global Vectors for Word Representation), and how does it differ from models like Word2Vec?   5M

15. A). Demonstrate the concept of Named Entity Recognition (NER) and describe its significance in NLP tasks.   10M

OR

15. B). Explain how Convolutional Neural Networks (CNNs) can be applied to sentence classification tasks. Discuss the advantages of using CNNs over other models, particularly for text classification tasks such as sentiment analysis, spam detection, and topic categorization.   10M

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Examination : M.Tech I Semester Regular & Supplementary Examinations March-2025
Course Name : Software Quality Engineering
Course Code : B458405
Branch : Computer Science & Engineering
Date & Session : 24.03.2025 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 expectations of quality?	1 M
2.	Define defects.	1 M
3.	What is Quality Assurance (QA)?	1 M
4.	Define Defect Reduction.	1 M
5.	What is quality planning?	1 M
6.	Define Quality assessment.	1 M
7.	What are the key steps in test planning?	1 M
8.	Define test execution	1 M
9.	What is checklist-based testing?	1 M
10.	Define partition coverage in software testing	1 M

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

11.A). Explain different quality frameworks used in software engineering.   10M

OR

11. B). Analyze the evolution of quality concepts in software development.   10M

12. A). Discuss the defect reduction techniques, including inspection and direct fault detection.   10M

OR

12. B). Explain the software fault tolerance and defect containment.   10M

13. A). Explain the activities and processes involved in quality engineering.   10M

OR

13. B). Evaluate the effectiveness of quality assessment and improvement methods.   10M

14. A). Discuss test automation and its significance in modern software testing   10M

OR

14. B). Explain about Result checking and measurement.   10M

15. A). Discuss testing based on partitions and checklist-based testing, along with their limitations.   10M

OR

15. B). Analyze Musa's operational profiles and their role in testing.   10M

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