H.T No: | | | | | | | | | | | **R22** **Course Code: B458302**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

Ph.D Course Work I Semester Regular Examinations March-2023

Course Name: ADVANCED DATA STRUCTURES

(Computer Science & Engineering)

Date: 20.03.2023 FN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

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

1.	Define heap structure.	1 M
2.	What is the time complexity of deleting an element from a heap?	1 M
3.	What is a hash function?	1 M
4.	What is a collision in hashing?	1 M
5.	Define an OBST.	1 M
6.	Illustrate the height of an OBST.	1 M
7.	Brief about Multiway Tries	1 M
8.	What is Binary Tries?	1 M
9.	What are some common pattern matching algorithms?	1 M
10.	Brief about naive algorithm.	1 M

PART-B

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

11.A).	Explain about Cascading Cut in Fibonacci heap.	10M
	OR	
11. B).	For the given input [35 33 42 10 14 19 27 44 26 31], construct Max heap and Min heap?	10M
12. A).	List and discuss about different types of techniques to resolve collisions in a hash table.	10M
	OR	
12. B).	Write an algorithm to insert a directory pair from a directory less dynamic hash table.	10M
13. A).	What is a Red black Tree? Explain how a red black tree can be represented.	10M
	OR	
13. B).	Explain the insertion and deletion operations in AVL tree with an example.	10M
14. A).	Explain the insertion, deletion and search operations on Digital Search Trees with an example.	10M
	OR	
14. B).	List the advantages and disadvantages of Tries.	10M
15. A).	Analyze the Brute force pattern matching.	10M
	OR	
15. B).	Discuss briefly about Knuth-Morris-Pattern matching Algorithm.	10M

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H.T No: | | | | | | | | | | | **R22** | **Course Code: B458301**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

Ph.D Course Work I Semester Regular Examinations March-2023

Course Name: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(Computer Science & Engineering)

Date: 23.03.2023 FN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

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

1. List the applications of propositional logic. 1 M
2. Write negation for the statements "If laptop is not working properly then Dr. Kumar can't take the class". 1 M
3. Represent the following relation R on the set X={1,2,3} in matrix form and graph form R = {(1,1),(2,2),(3,3),(2,3),(3,1),(1,3)} 1 M
4. Find the transitive closure of the given relation *{(1,1),(3,2),(2,3),(3,1),(1,2)(2,3)}* 1 M
5. Define the characteristics of an algorithm. 1 M
6. Define strong induction. 1 M
7. Differentiate expected value and Variance. 1 M
8. Define Bayes theorem. 1 M
9. Differentiate Tree and Graph. 1 M
10. Define Euler formula for connected planar graph. 1 M

PART-B

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

11.A). Show that P→(Q→R) is logically equivalent to (P^ Q) → R 10M

OR

11. B). Show that R Λ (P V Q) is valid conclusion from set of premises P V Q , Q → R, P → M and ~ M. Show that R Λ (P V Q) is valid conclusion from set of premises P V Q, Q → R, P → M and ~ M. 10M

12. A). Let X = {1,2,3,4,5,6} and relation R on set X is defined as R = {(a,b) | a-b is divisible by 3} . Show that R is equivalence relation. 10M

OR

12. B). For the relation R ={(1,3),(1,4),(2,3),(2,4),(3,1),(3,4)}on the set { 1,2,3,4 }, determine whether it is reflexive, irreflexive, symmetric , asymmetric, anti-symmetric and transitive or not. Justify your answer. 10M

13. A). Explain recursive algorithms with suitable examples. 10M

OR

13. B). Briefly discuss about the complexity of algorithms will be calculated. 10M

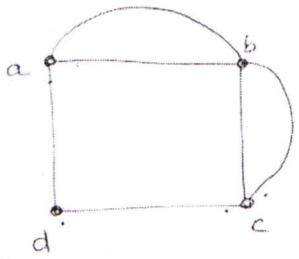
(P.T.O..)

14. A). Solve the following linear recurrence relation: $a_n - 3\ a_{n-1} - 4\ a_{n-2} = 0$ for $n \geq 2$, $a_0 = 1$ and $a_1 = 1$ 10M

OR

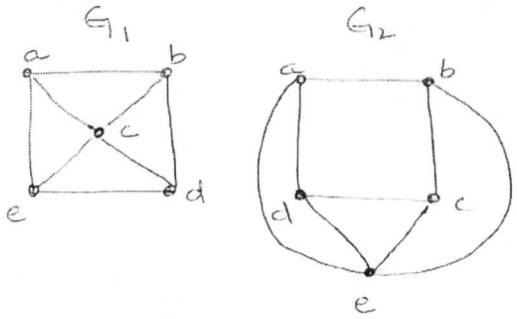
14. B). Explain the concept of divide and conquer with an example. 10M

15. A). Define Euler Path and Euler circuit. Check whether the given graph has Euler path, Euler circuit or neither. 10M



OR

15. B). Define Graph Isomorphism. Analyze the following two graphs G1 and G2 are isomorphic or not? 10M



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H.T No: | | | | | | | | | | | **R22** **Course Code: B458402**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

Ph.D Course Work I Semester Regular Examinations March-2023

Course Name: DEEP LEARNING

(Computer Science & Engineering)

Date: 25.03.2023 FN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

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

1.	Interpret vanishing gradient problem.	1 M
2.	Define unit saturation.	1 M
3.	Summarize pooling layers in CNNs.	1 M
4.	What are the variational autoencoders?	1 M
5.	Outline the popular deep learning frameworks for computer vision applications.	1 M
6.	What are the LSTM models be can used for video to text tasks?	1 M
7.	Define vector space model of semantics.	1 M
8.	Outline some of the applications of word embeddings.	1 M
9.	List about the LSTMs used for dialogue generation.	1 M
10.	Outline some of the challenges of named entity recognition.	1 M

PART-B

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

11.A).	Explain about the Feed forward Neural Networks.	10M
	OR	
11. B).	Explain about Regularization.	10M
12. A).	Classify Recurrent Neural Networks.	10M
	OR	
12. B).	Explain about Dynamic Memory Models in detail.	10M
13. A).	Illustrate about Automatic image Captioning.	10M
	OR	
13. B).	Explain Attention models for computer vision tasks.	10M
14. A).	Demonstrate Continuous-Bag-of-Words model (CBOW).	10M
	OR	
14. B).	Explain about evaluations & applications in Word Similarity.	10M
15. A).	Apply Sentence Classification by making use of CNN.	10M
	OR	
15. B).	Explain about Dialogue Generation with LSTMs.	10M

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H.T No: | | | | | | | | | | | R22 | Course Code: B458405

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

Ph.D Course Work I Semester Regular Examinations March-2023

Course Name: SOFTWARE QUALITY ENGINEERING

(Computer Science & Engineering)

Date: 27.03.2023 FN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

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

1. Outline the software quality properties. 1 M
2. Compare defect and bug. 1 M
3. List most important quality attributes. 1 M
4. How risk identification is happened in whole software development process. 1 M
5. Recall any two activities for quality engineering. 1 M
6. List any two major quality improvement checklists. 1 M
7. Define Testing. 1 M
8. Distinguish between test automation and manual testing. 1 M
9. What is partition coverage? 1 M
10. What is usage testing based on checklist? 1 M

PART-B

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

11.A). Discuss in detail about software quality. 10M

OR

11. B). Illustrate the quality frameworks and ISO-9126 standard in detail. 10M

12. A). What is defect prevention and explain different prevention techniques? 10M

OR

12. B). Summarize software fault tolerance in detail. 10M

13. A). What is the role of quality engineering in software process. 10M

OR

13. B). What are the key factors involved in setting the quality planning goals and strategy formation explain in detail? 10M

14. A). Elaborate template for test planning and preparation. 10M

OR

14. B). Explain test execution process and result checking with suitable example. 10M

15. A). Discuss usage based statistical testing with Musa's operational profiles. 10M

OR

15. B). Construct operational profiles by considering any case study. 10M

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