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B. Tech CSE-Cyber Security III Semester Examinations (Dec 2025)
Data Structures (BT-CYS-201A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory. Each Question carries 12 marks.

Q.1		**Marks**
(a)	Define time complexity and space complexity of an algorithm.	1.5
(b)	Describe are the advantages and disadvantages of linked list over array?	1.5
(c)	In the computer system there are 'undo' and 'redo' operations, which data structure is used to perform this operation. Justify your answer.	1.5
(d)	Consider the following queue, where queue is a circular queue having 6 memory cells. Front=2, Rear=4 Queue: _, A, C, D, _, _ Describe queue as following operation take place: a) F is added to the queue b) Two letters are deleted c) R is added to the queue d) S is added to the queue	1.5
(e)	Draw a binary Tree for the expression: A * B - (C + D) * (P / Q)	1.5
(f)	Explain in brief the Extended Binary Tree.	1.5
(g)	Compare DFS and BFS in terms of Space and Time Complexities.	1.5
(h)	Illustrate digraph? Define the terms in-degree and out-degree with respect to a digraph.	1.5

UNIT-I

Q.2(a)	Illustrate an algorithm of searching in linked list when the list is sorted.	6
Q.2(b)	Explain Big -Oh notation with the help of examples.	6
Q.3(a)	Explain how strings are represented in memory.	6
Q.3(b)	Suppose a 2-D Array A [-100: 100, -5: 50]. Find the address of element A [89, 39] considering base address 1000 and each element requires 2 bytes for storage. Follow row major order.	6

UNIT-II

Q.4(a)	Explain queue. Give the algorithm of deletion in the circular queue.	6
Q.4(b)	Convert the expression ((A + B) * C - (D - E) ^ (F + G)) to equivalent Prefix notations.	6
Q.5(a)	Show all the passes using insertion sort with the following list- 13,33,27,77,12,43,10,432,112,90	6

Q.5(b) Explain ADT for Stack data structure. 6

UNIT-III

Q.6(a) Create a red black tree by inserting following sequence of number- 8, 18, 5, 15, 17, 25, 40, and 80 6

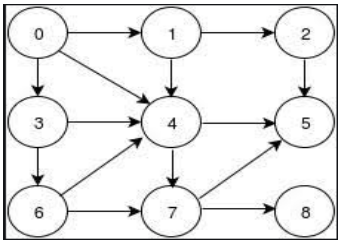
Q.6(b) Compare B Tree and B+ Tree. 6

Q.7(a) Explain Insertion and Deletion Operations on BST with Example. 6

Q.7(b) Construct the B-Tree of order 3 for the following data with proper diagram: 1,7,6,2,11,4,8,5,15,3,12 6

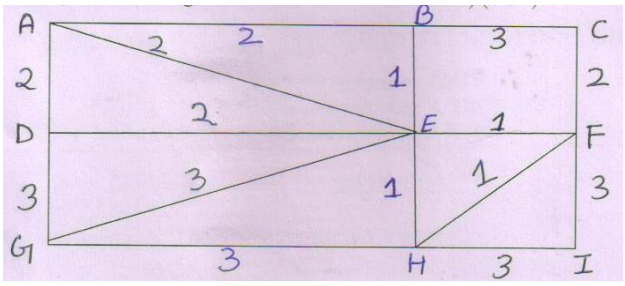
UNIT-IV

Q.8(a) Explain DFS and BFS with starting node as '0' step by step in the following graph: 6

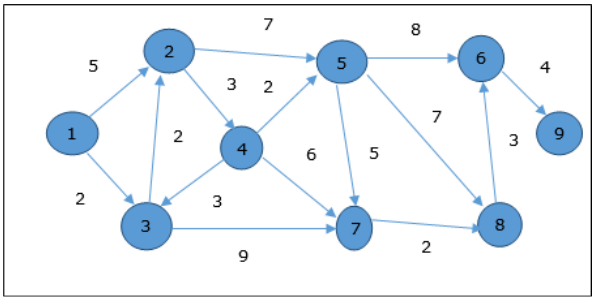


Q.8(b) Explain the Adjacency List representation of a graph. How is it different from the Adjacency Matrix? 6

Q.9(a) Draw the minimum cost spanning tree for the graph given below using Prim's and Kruskal's Algorithms: (For Prim's algorithm considers 'A' as source) 6



Q.9(b) Find out the shortest path from node 1 to node 9 in a given graph using Dijkstra's Algorithm. 6



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B.Tech CSE-Cyber Security III Semester Examinations (Dec 2025)
Object Oriented Programming (BT-CYS-203A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory. Each Question carries 12 marks.

Q.1		**Marks**
(a)	Define Encapsulation and write one real-life example.	2
(b)	Differentiate between function overloading and overriding.	2
(c)	What is a constructor? State any two features.	2
(d)	What is a pure virtual function? Why is it used?	2
(e)	Write the syntax of exception handling using try, catch, throw.	2
(f)	Define operator overloading. Mention any binary operator that can be overloaded.	2

UNIT-I

Q.2(a)	Explain how access specifiers support data protection in OOP with examples.	6
Q.2(b)	Develop a C++ program to demonstrate default arguments in functions.	6
Q.3(a)	Analyze the differences between compile-time polymorphism and runtime polymorphism in C++ with suitable examples.	6
Q.3(b)	Justify the need for SOLID principles in OOP with examples.	6

UNIT-II

Q.4(a)	Explain different types of constructors in C++ with examples.	6
Q.4(b)	Write a C++ program demonstrating the use of this pointer to resolve ambiguity.	6
Q.5(a)	Compare friend functions and inline functions with examples.	6
Q.5(b)	Evaluate the advantages of using static data members in C++ classes. When should they be preferred over regular data members? Justify your answer with reasons.	6

UNIT-III

Q.6(a)	Explain the need and working of virtual functions in runtime polymorphism.	6
Q.6(b)	Write a C++ program to overload the * operator for a class.	6
Q.7(a)	Construct a C++ program demonstrating containership and explain its significance.	6
Q.7(b)	Examine the difference between static and dynamic binding in C++ with examples.	6

UNIT-IV

Q.8(a)	Explain the process of reading and writing objects using file streams in C++.	6
Q.8(b)	Develop a function template to swap values of any data type.	6
Q.9(a)	Evaluate the use of multiple catch blocks in C++. In what situations are they more effective than a single catch block? Provide reasons.	6
Q.9(b)	Write a C++ program that takes user input for division and throws an exception when the denominator is zero. Explain how your program handles the exception.	6

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B. Tech CSE-Cyber Security III Semester Examinations (Dec 2025)
Essentials of Cyber Security (BT-CYS-207A)

Time- 3hrs
Max.Marks-60

Attempt 5 questions in all, selecting one question from each unit and Question 1 is compulsory. Each Question carries 12 marks.

Q.1		**Marks**
(a)	A company's database containing customer emails and passwords was leaked to the public because it was not encrypted at rest. Which component of CIA triad does not comply with the above situation.	2
(b)	List the two differences between a computer virus and a worm.	2
(c)	What are the two types of intrusion prevention system?	2
(d)	Discuss some common password cracking tools. How to decipher the hashed passwords present in /etc/shadow of Kali Linux?	2
(e)	List two differences between Intrusion Detection System (IDS) and Intrusion Prevention System (IPS).	2
(f)	How to avoid buffer overflow vulnerabilities	2

UNIT-I

Q.2(a)	What is the CIA Triad in Cyber Security? Give example of cryptographic primitives that ensure the above security features.	6
Q.2(b)	What is security risk analysis? Describe the steps involved in performing a risk assessment.	6
Q.3(a)	Explain the various threats to information systems, such as malware, insider threats, phishing, and denial-of-service attacks.	6
Q.3(b)	Discuss the need for information security in organizations and government sectors.	6

UNIT-II

Q.4(a)	What is buffer overflow? Illustrate with a simple C code example and explain the vulnerability.	6
Q.4(b)	Illustrate the principle of steganography and its application in cyber-crime. How can organizations detect and prevent its misuse?	6
Q.5(a)	How would you test a website for SQL injection vulnerabilities manually? Also, discuss the types of SQL injection with its prevention technique.	6
Q.5(b)	A finance company reports that multiple employees received emails appearing to be from the CEO, requesting urgent transfers of funds to a new account. Analyze how phishing emails can be crafted to bypass basic security checks. What steps should employees and IT departments take to authenticate such requests and prevent financial loss?	6

UNIT-III

Q.6(a)	Illustrate different types of firewalls. Also, What is the difference between stateful and stateless firewall?	6
Q.6(b)	What are access control security models? Differentiate between discretionary access control (DAC), mandatory access control (MAC) and role-based access control (RBAC).	6
Q.7(a)	Explain the working principle of Intrusion Detection System (IDS) with its types.	6
Q.7(b)	What is the difference between authorization and authentication? Also, Discuss process and memory protection techniques used by operating systems.	6

UNIT-IV

Q.8(a)	Describe the salient features and objectives of the Indian IT Act, 2000 and its amendments.	6
Q.8(b)	Discuss the different phases/life cycle of Digital Forensics.	6
Q.9(a)	Explain the importance of legal perspectives in understanding and preventing cybercrimes.	6
Q.9(b)	What is digital forensics? Write some common tools used for digital forensics. Also, Discuss the history of digital forensics.	6

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