REG.NO.:

VIT
Vellore Institute of Technology

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING
MID TERM EXAM
SUMMER SEMESTER 2024-2025

SLOT: F1+TF1+F2+TF2

Programme Name & Branch	**: M. Tech - Integrated & CSE**
Course Code and Course Name	**: CSI3013 and Blockchain Technologies**
Faculty Name(s)	**: Dr. Saranya. P**
Class Number(s)	**: VL2024250700462**
Date of Examination	**: 10-06-2025 / AN**
Exam Duration	**: 90 minutes** **Maximum Marks: 50**

General instruction(s):

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcomes (Type the CO statements covered in this question paper. Use the CO number as per the syllabus copy)

1. Understand the basics of cryptographic hash functions and blockchain
2. Demonstrate the functional blocks of the bitcoin and cryptocurrencies
3. Describe the consensus algorithms and its challenges

Q. No	Question	M	CO	BL
1.	*Explain how the properties of a cryptographic hash function—particularly collision resistance and puzzle-friendliness—are leveraged to create secure digital signatures in blockchain transactions.* Discuss with any real time example.	10	1	2
2.	Two data centers in different locations must coordinate to update a shared database in a distributed system. However, they face communication delays and occasional message loss. Using the Two Generals Problem, explain the core challenge in ensuring consistency between these data centers. Why is reliable communication essential in distributed computing?	10	1	2
3.	A malicious user tries to exploit the network by initiating two transactions with the same coin to two different recipients simultaneously. Apply your knowledge of blockchain validation and consensus to explain how double spending can occur and what mechanisms prevent it in systems like Bitcoin.	10	2	3
4.	Two miners simultaneously find a valid block and broadcast it to the network. Some nodes accept one block, while others accept the other. Analyze how the Bitcoin network handles this fork, what determines the valid chain moving forward, and how block propagation delays influence consensus stability.	10	2	4
5.	A developer is building a decentralized voting application and is choosing between Ethereum and Bitcoin as the underlying platform. The application requires programmable rules, real-time execution, and transparency.	10	3	4

	Analyze whether Ethereum or Bitcoin is more suitable for deploying decentralized applications (DApps) like smart voting systems. In your answer, compare their scripting capabilities, consensus mechanisms, and development ecosystems.			

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