Roll No: | | | | | | | | | | | |

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY

Presidency University Act, 2013 of the Karnataka Act No. 41 of 2013 | Established under Section 2(f) of UGC Act, 1956
Approved by AICTE, New Delhi | Approved By BCI
Bengaluru

Mid Term Examinations - October 2026

Date: 05/10/2026 **Time:** 02:00 PM - 03:30 PM

Course Code: CBC2000 **Course Name:** Foundations of Blockchain Technology

Semester: Fifth Semester **Max. Marks:** 50 **Weightage:** 50%

CO - Levels	CO1	CO2
Marks	88	92

PART A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	What is meant by a block in a blockchain?	2	CO1	BT2
2	How does blockchain differ from a traditional centralized database?	2	CO1	BT2
3	What is a Merkle root and where is it stored in a blockchain block?	2	CO2	BT2
4	What is a cryptographic hash function? Mention one important property of a hash function.	2	CO2	BT2
5	What is a consortium blockchain? Who generally controls or participates in such a network?	2	CO2	BT2

PART B : Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
6	Explain the architecture of a blockchain system in detail. Describe the major components of blockchain architecture and explain how they collectively enable secure and reliable transaction recording.	10	CO1	BT2
7	a) Explain the concept of Distributed Ledger Technology (DLT) and its major characteristics. (5 Marks) b) Differentiate DLT from a conventional centralized database with suitable examples (5 Marks)	10	CO1	BT2

PART C: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
8	Discuss the key characteristics of blockchain technology - immutability, transparency, decentralization, and trust. Explain how these characteristics contribute to the reliability of blockchain-based systems.	10	CO1	BT2
9	A supply-chain organization wants to track products from manufacturing to final delivery using blockchain. Explain the proposed blockchain-based approach and discuss how decentralization, transparency, immutability, and distributed data storage can improve the system.	10	CO1	BT2

PART D: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT

PTO (Please Turn Over)

10	A user wants to send cryptocurrency to another user using a blockchain wallet. Demonstrate how public keys, private keys, wallet addresses, and digital signatures are involved in creating and authenticating the transaction.	10	CO2	BT3
11	Consider a simplified blockchain described below and answer the questions below. The hash of a block is calculated as: $H = (\text{Previous Hash} + \text{Transaction Value} + \text{Nonce}) \bmod 499$ The Genesis Block has: Previous Hash = 0, Transaction Value = 250 and Nonce = 22. Three subsequent blocks contain the following transactions: Block | Transaction | Nonce Block 1 | 126 | 18 Block 2 | 178 | 22 Block 3 | 250 | 15 The hash of each block is used as the Previous Hash of the next block. a) Calculate the hash of the Genesis Block, Block 1, Block 2 and the Block 3. (6 marks) b) Represent the resulting blockchain showing the Block Number, Transaction, Previous Hash, and Current Hash. (4 marks)	10	CO2	BT3

PART E: Answer Any 1 Following Questions. 10 M				
Q.N.	**Questions**	**M**	**CO**	**BT**
12	A blockchain block contains 16 transactions, and one transaction is modified after the block has been created. Apply the concepts of SHA-256 hashing and Merkle trees to explain how the modification can be detected and how it affects the Merkle root and block integrity.	10	CO2	BT3
13	A blockchain block contains four transactions: T1 = 20, T2 = 30, T3 = 40, and T4 = 50. For this exercise, use the following simplified hash function: $H(x) = x + 1) \bmod 47$ For combining two hashes: $H(a, b) = (a + b) \bmod 47$ a) Calculate the hash of each transaction (2.5 marks) b) Calculate the Merkle Root and levels of Merkle Tree. (2.5 marks) c) Draw the complete Merkle tree. (5 marks)	10	CO2	BT3