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
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Bengaluru

Mid Term Examinations - October 2026

Date: 09/10/2026 **Time:** 02:00 PM - 03:30 PM

Course Code: CSE2289 **Course Name:** Foundations of Block Chain Technology

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

CO - Levels	CO1	CO2
Marks	34	56

PART A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	A company maintains copies of its transaction ledger at five different locations. However, the ledger is **not organized into blocks**. Is it necessarily a blockchain? Give a reason.	2	CO1	BT1
2	A user wants to purchase an NFT using a blockchain wallet. **Which cryptographic key must the user keep secret, and why?**	2	CO2	BT2
3	A transaction has been successfully verified, but it has not yet been included in a block. **Where is the transaction normally kept while waiting for inclusion?**	2	CO2	BT1
4	A blockchain application allows a user to prove ownership of a digital asset using a token. **Which blockchain concept is being used? State one example.**	2	CO1	BT1
5	In a 2-of-3 multi-signature wallet, Alice and Bob approve a transaction while Carol does not. **Can the transaction be authorized? Give a reason.**	2	CO2	BT3

PART B : Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
6	A university initially uses a website where students can only **view information**. Later, it introduces a platform where students can upload, edit and share their content. The university now wants to introduce blockchain-based ownership of certificates and digital assets. **Answer the following:** **a)** Identify the characteristics of Web 1.0 represented by the first system. **b)** Identify the characteristics of Web 2.0 represented by the second system. **c)** Explain how the proposed blockchain-based system represents Web 3.0. **d)** Explain how blockchain can provide **digital ownership and decentralized trust** in this system. **e)** Give one suitable blockchain-based application for the university.	10	CO1	BT3

PTO (Please Turn Over)

7	Consider a blockchain-based **supply-chain system** in which a product manufacturer records the movement of products from the manufacturer to the distributor and finally to the retailer. Explain how the following blockchain layers/components support this system: **a)** Data Layer **b)** Network Layer **c)** Consensus Layer **d)** Smart Contract Layer **e)** Application Layer For each layer, relate its role specifically to the given supply-chain example.	10	CO1	BT3

PART C: Answer Any 1 Following Questions. 10 M				
Q.N.	**Questions**	**M**	**CO**	**BT**
8	Consider the following simplified hash function: H(x)=(sum of ASCII values of characters in x)mod 50H(x)=(\text{sum of ASCII values of characters in }x)\mod50 Use: A=65,B=66,C=67,D=68A=65,\quad B=66,\quad C=67,\quad D=68 A simplified blockchain contains: **Block 1** Data = **"AB"** Previous Hash = 0 **Block 2** Data = **"CD"** Previous Hash = Hash of Block 1 Calculate: **a)** Hash of Block 1. **b)** Hash of Block 2. **c)** If the data of Block 1 is changed from **"AB"** to **"AC"**, calculate the new hash of Block 1. **d)** Calculate the new hash of Block 2 using the modified Block 1 hash. **e)** State what this calculation demonstrates about blockchain block linking.	10	CO2	BT3
9	Ravi wants to transfer cryptocurrency to Meera using a blockchain network. Ravi creates the transaction and signs it before broadcasting it to the network. The network nodes then verify the transaction before it is included in a block. **Explain the complete digital-signature process in this transaction.** **Your answer should include:** **a)** Explain how Ravi's **private key and public key** are involved in creating and verifying the digital signature. **b)** Explain how the network verifies that the transaction was authorized by Ravi **without receiving or revealing his private key**. **c)** Suppose an attacker modifies the transaction amount after Ravi has signed it. Explain how the digital signature helps the network detect the modification. **d)** Explain **any two security properties** provided by digital signatures in blockchain.	10	CO2	BT3

PART D: Answer Any 1 Following Questions. 10 M				
Q.N.	**Questions**	**M**	**CO**	**BT**
10	A block contains **eight transactions**: T1,T2,T3,T4,T5,T6,T7,T8T_1,T_2,T_3,T_4,T_5,T_6,T_7,T_8 Let: Hi=Hash(Ti)H_i=Hash(T_i) **Answer the following:** **a)** Draw the complete **Merkle Tree** for the eight transactions. **[5]** **b)** Label all leaf hashes, intermediate hashes and the Merkle Root. **[2]** **c)** Write the expressions for: H12,H34,H56,H78H_{12}, H_{34}, H_{56}, H_{78} **[2]** **d)** Write the expression for the final Merkle Root. **[1]**	10	CO2	BT3

11	A student is planning to use blockchain-based cryptocurrency and is exploring different types of wallets for different purposes. **Explain the concept of a blockchain wallet and discuss the different types of wallets based on their connectivity and usage. Give suitable examples for each type and explain which type of wallet would be appropriate for frequent cryptocurrency transactions and which would be more suitable for long-term storage of digital assets. Also explain the concept of a multi-signature wallet and describe one practical situation where it can be used.**	10	CO2	BT3

PART E: Answer Any 1 Following Questions. 10 M				
Q.N.	**Questions**	**M**	**CO**	**BT**
12	A user initiates a cryptocurrency transaction on a blockchain network. The transaction must be authenticated and verified by the network before it can be included in a block. **Explain how digital signatures are used in this process, including the roles of the private key and public key, how the transaction is signed and verified, and how digital signatures provide authentication, integrity, and non-repudiation. Also explain what could happen if the private key of the user is compromised.**	10	CO2	BT2
13	Blockchain technology is increasingly being used in areas beyond cryptocurrency. Discuss the applications of blockchain technology in any four real-world domains, explaining how blockchain features such as decentralization, transparency, immutability, and tokenization can address problems in each domain. Illustrate your answer with suitable examples of how blockchain can be used in areas such as healthcare, supply chain, finance, digital identity, or other relevant application	10	CO1	BT2