Roll No.											

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – December 2025

Date: 08-12- 2025 **Time:** 01:00pm – 04:00pm

School: SOIS	**Program**: BCA	
Course Code : CSA3006	**Course Name:** BLOCKCHAIN TECHNOLOGY	
Semester: V	**Max Marks**:100	**Weightage**: 50%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Marks	**26**	**26**	**24**	**24**	

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M

1.	How is blockchain different from a traditional database?	2 Marks	L1	CO1
2.	Define a private blockchain with an example.	2 Marks	L1	CO1
3.	Define hot and cold wallet in cryptocurrency.	2 Marks	L1	CO1
4.	What is the function of the nonce in Bitcoin mining?	2 Marks	L1	CO2
5.	What is the use of digital signatures in blockchain?	2 Marks	L1	CO2
6.	What are smart contracts?	2 Marks	L1	CO2
7.	Recall the use of solidity programming in Ethereum?	2 Marks	L1	CO3
8.	What is pseudo-anonymity in blockchain, and how does it differ from complete anonymity?	2 Marks	L1	CO3
9.	Omit the role of blockchain transparency in supply chain management?	2 Marks	L1	CO4
10.	How does blockchain ensures security in healthcare data management.	2 Marks	L1	CO4

Part B

Answer the Questions. **Total Marks 80M**

11.	**a.**	Outline the main components of blockchain architecture, including nodes, blocks, transactions, and ledgers. Explain the role of Merkle tree in the blockchain structure.	**10M**	**L2**	**CO1**
		Or			
12.	**a.**	Explain how distributed ledger technology differ from traditional methods. Mention the benefits of blockchain in distributed systems.	**10M**	**L2**	**CO1**

13.	**a.**	Summarize the necessity of Byzantine Fault Tolerance (BFT) usage in PoA consensus mechanism.	**10 M**	**L2**	**CO1**
		Or			
14.	**a.**	Explain Proof of Work (PoW) and Proof of Stake (PoS) in detail. What are the different types of incentives used in blockchain networks?	**10M**	**L2**	**CO1**

15.	**a.**	Explain the process of Bitcoin mining in detail, including the role of mining hardware and its evolution over time. Discuss the factors affecting Bitcoin mining profitability and provide a step-by-step guide for setting up a mining operation.	**10M**	**L2**	**CO2**
		Or			
16.	**a.**	Explain the working of the Unspent Transaction Output (UTXO) model in Bitcoin. Compare it with the account-based model used in Ethereum, highlighting their key differences.	**10M**	**L2**	**CO2**

17.	**a.**	Explain the significance of the Merkle Tree in Bitcoin and its role in transaction verification. Discuss how it enhances efficiency, security, and scalability in the blockchain network.	**10M**	**L2**	**CO2**
		Or			
18.	**a.**	Illustrate the risks associated with mining pool centralization and ways to mitigate them. Additionally, explain the challenges of using renewable energy sources for Bitcoin mining.	**10M**	**L2**	**CO2**

19.	**a.**	Explain the architecture of the Ethereum network. Describe the role of each component in the Ethereum ecosystem.	**10M**	**L2**	**CO3**

Or					
20.	**a.**	Illustrate how transactions work in Ethereum with a suitable example. Explain nonce, gas, and digital signatures in Ethereum.	**10M**	**L2**	**CO3**

21.	**a.**	What is EVM bytecode? Describe the Ethereum fee schedule and the concept of gas. How is it used to prevent abuse?	**10M**	**L1**	**CO3**
Or					
22.	**a.**	Summarize the process of deploying a smart contract on Ethereum. Include the compilation and deployment phases.	**10M**	**L2**	**CO3**

23.	**a.**	Explain how blockchain ensures transparency and accountability in supply chain management of Walmart company.	**10M**	**L2**	**CO4**
Or					
24.	**a.**	Analyze a financial institution or fintech company using blockchain using a case study (e.g., Ripple, JP Morgan's Quorum, or DeFi platform like Compound).	**10M**	**L4**	**CO4**

25.	**a.**	Examine a real-world blockchain application in the automobile industry. Describe the problem it addresses, the implemented solution, and the resulting impact, using a case study.	**10M**	**L4**	**CO4**
Or					
26.	**a.**	Examine a case study of real healthcare leveraging blockchain. (e.g., MedRec or Guardtime in Estonia).	**10M**	**L4**	**CO4**