PRESIDENCY UNIVERSITY
BENGALURU

SET - B

SCHOOL OF ENGINEERING
END TERM EXAMINATION – MAY/JUNE 2024

Semester : Semester VIII - 2020   **Date :** June 03 , 2024

Course Code : CSE2019   **Time :** 09.30am to 12.30pm

Course Name : Foundations of Blockchain Technology   **Max Marks :**100

Program : B.Tech-Computer Science and Engineering   **Weightage :** 50%

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Note: 1. Answer ALL 5 FULL Questions.
2. Each Full Question carries 20 Marks
3. Scientific and non-programmable calculator are permitted.
4. Do not write any information on the question paper other than Roll Number.

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1.a.	What is one downside of using blockchain for everyday transactions? **[Knowledge]**	**(CO1)**	**(04 Marks)**
1.b.	Explain in your own words the concept of immutability in a blockchain? **[Comprehension]**	**(CO1)**	**(06 Marks)**
1.c.	Describe a scenario in which a public blockchain would be more advantageous than a private blockchain. Justify your choice by applying the concepts of transparency, security, and decentralization. **[Application]**	**(CO1)**	**(10 Marks)**

or

2.a.	Briefly describe one way blockchain technology has evolved since its introduction in the late2000s. **[Knowledge]**	**(CO1)**	**(04 Marks)**
2.b.	Give an example of a situation where a consortium blockchain might be preferable over a public blockchain. Explain **[Comprehension]**	**(CO1)**	**(06 Marks)**
2.c.	Imagine a scenario where a group of universities want to collaborate on academic research and share data securely. They require a network that is efficient, scalable, and allows for selective access control. Discuss two potential tiers of blockchain technology (Public, Private, Consortium) that could be suitable for this use case. Explain the advantages and disadvantages of each tier in this context. **[Application]**	**(CO1)**	**(10 Marks)**

3.a.	What is the main factor considered when choosing validators in Proof-of-Stake (PoS)?Explain **[Knowledge]**	**(CO2)**	**(04 Marks)**
3.b.	Imagine a scenario where a group of friends wants to create a private blockchain network for sharing files securely. Proof-of-Work (PoW) might not be ideal for this purpose. Why not? **[Comprehension]**	**(CO2)**	**(06 Marks)**

3.c.	A consortium blockchain is being developed for a group of banks to share sensitive financial data. Considering the need for both security and efficiency, which consensus mechanism would be a better fit: Byzantine Fault Tolerance (BFT) or Proof-of-Stake (PoS)? Justify your answer by comparing the advantages and disadvantages of each mechanism in the context of a consortium blockchain. **[Application]**	**(CO2)**	**(10 Marks)**

or

4.a.	What is the main purpose of a consensus mechanism in a blockchain network? **[Knowledge]**	**(CO2)**	**(04 Marks)**
4.b.	Explain the core purpose of a consensus mechanism in a blockchain network. Why is it crucial for maintaining network security and integrity? **[Comprehension]**	**(CO2)**	**(06 Marks)**
4.c.	Research a new or emerging consensus mechanism beyond PoW, PoS, and DPoS. Briefly describe its core concept and how it functions. Then, compare and contrast this new mechanism with Proof-of-Stake (PoS) in terms of their suitability for securing a public blockchain with a large and diverse user base. **[Application]**	**(CO2)**	**(10 Marks)**

5.a.	Briefly describe two key features of Bitcoin that differentiate it from traditional currencies. **[Knowledge]**	**(CO3)**	**(04 Marks)**
5.b.	Briefly describe two advantages and two disadvantages of using Bitcoin for online payments. **[Comprehension]**	**(CO3)**	**(06 Marks)**
5.c.	A company is developing a secure messaging platform that utilizes digital keys and addresses for user authentication and data encryption. Explain how this technology could be applied in their platform, considering the advantages and disadvantages. **[Application]**	**(CO3)**	**(10 Marks)**

or

6.a.	What is the process called for adding new transaction data to the Bitcoin blockchain? **[Knowledge]**	**(CO3)**	**(04 Marks)**
6.b.	Imagine you're losing your phone with a mobile Bitcoin wallet app. How would you recover your Bitcoin funds? **[Comprehension]**	**(CO3)**	**(06 Marks)**
6.c.	Discuss potential solutions to improve transaction throughput on the Ethereum network. Analyze the benefits and drawbacks of each solution. **[Application]**	**(CO3)**	**(10 Marks)**

7.a	What are the key difference between Ethereum and Bitcoin? **[Knowledge]**	**(CO4)**	**(04 Marks)**
7.b.	What is the purpose of gas in the Ethereum network, and how does it relate to transaction fees? **[Comprehension]**	**(CO4)**	**(06 Marks)**
7.c	Explain how Decentralized Autonomous Organizations (DAOs) leverage smart contracts and native tokens to function and achieve their goals. Use specific examples to illustrate your explanation. **[Application]**	**(CO4)**	**(10 Marks)**

or

8.a	What is the consensus mechanism used by the Ethereum network to validate transactions? **[Knowledge]**	**(CO4)**	**(04 Marks)**
8.b.	Compare and contrast the functionalities of Ethereum Virtual Machine (EVM) with a traditional computer's virtual machine. **[Comprehension]**	**(CO4)**	**(06 Marks)**
8.c	Smart contracts offer numerous benefits, but security remains a key concern. Discuss three major security challenges associated with smart contracts and explain how developers can mitigate these risks. **[Application]**	**(CO4)**	**(10 Marks)**

9.a	Where are your private keys stored in a Bitcoin wallet explain? **[Knowledge]**	**(CO3)**	**(04 Marks)**
9.b	How does the public key cryptography ensure secure transactions on a blockchain network? **[Comprehension]**	**(CO3)**	**(06 Marks)**
9.c	Compare and contrast Proof-of-Work (PoW) with Proof-of-Stake (PoS) as consensus mechanisms in blockchains. Discuss which mechanism might be better suited for future blockchain applications. **[Application]**	**(CO3)**	**(10 Marks)**

Or

10.a	List out the type of application built on the Ethereum blockchain. **[Knowledge]**	**(CO4)**	**(04 Marks)**
10.b	Explain the concept of Decentralized Autonomous Organizations (DAOs) and how they can be implemented using smart contracts on the Ethereum network. **[Comprehension]**	**(CO4)**	**(06 Marks)**
10.c	Discuss the security challenges associated with smart contracts. How can developers mitigate these risks and ensure the secure execution of smart contracts? **[Application]**	**(CO4)**	**(10 Marks)**