## MSE -March 2024

**Course Code: OEIT1**
**Name of the Course: Blockchain Technology and Applications**
**Max. Marks: 30 Duration: 60 Min.**
**Branch: All**

**Instructions:**
1) All questions are compulsory.
2) Draw neat diagrams.
3) Assume suitable data if necessary but justify the same.

| Q. No. | Question | Max. Marks | COs | BL |
|---|---|---|---|---|
| Q. 1 (a) | Evaluate the impact of Bitcoin's fixed supply of 21 million coins and Ethereum's evolving monetary policy on their perceived value as digital assets. Consider the potential effects on inflation, deflation, and their role as stores of value in the long term. | 05 | CO1 | 4 |
| Q. 1 (b) | Given the current state of the Bitcoin network difficulty and its impact on the mining process, apply your understanding to address the following scenario: If the network difficulty were to increase significantly in the next adjustment period, describe how this change would likely affect the mining ecosystem. Apply your knowledge to explain potential consequences for individual miners, mining pools, and the overall security of the Bitcoin network. Consider factors such as hash rate, block generation time, and the economic incentives for miners in your response. | 05 | CO1 | 3 |
| Q. 2 (a) | Analyze the progression from Blockchain 1.0 to Blockchain 3.0, considering the major technological advancements and shifts in development paradigms. Compare and contrast the key features, use cases, and architectural changes associated with each blockchain version. Explore how Blockchain 3.0 builds upon the foundations of 1.0 and 2.0, and analyze the impact of innovations such as smart contracts, scalability solutions, and interoperability protocols. | 05 | CO2 | 4 |
| Q. 2 (b) | Create an innovative use case that seamlessly integrates Non-Fungible Tokens (NFTs) with Decentralized Finance (DeFi). Design a scenario where NFTs contribute significantly to the functionality and value proposition of a DeFi protocol. Outline the specific DeFi platform, the nature of the NFTs involved, and how they enhance or introduce unique features within the decentralized financial ecosystem. Consider aspects such as governance, lending, borrowing, or other financial activities. Additionally, explore the potential impact on user engagement, liquidity, and the overall user experience in this creative use case. | 05 | CO2 | 3 |

**OR**

Create a compelling use case that integrates Decentralized
Autonomous Organizations (DAOs) and tokenization to address a

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| | real-world challenge or opportunity. Develop a scenario where DAO governance and tokenized assets play a crucial role in achieving a specific objective. Specify the industry or domain, outline the functions of the DAO, and describe how tokenization enhances participation, decision-making, or value distribution within the organization. Consider factors such as transparency, inclusivity, and the potential impact on stakeholders. Additionally, discuss any challenges that might arise and propose creative solutions to address them in your envisioned use case. | | | |
| Q. 3 (a) | Apply your understanding of Solidity programming and the Ethereum Virtual Machine (EVM) to propose strategies for reducing gas fees in smart contract deployments. Consider a basic smart contract written in Solidity:<br><br>```solidity<br>// Version 1: Simple Storage Contract<br>// SPDX-License-Identifier:GPL3.0<br>pragma solidity ^0.8.0;<br><br>contract SimpleStorage {<br>    uint256 public storedData;<br><br>    function set(uint256 _value) public {<br>        storedData = _value;<br>    }<br>}<br>```<br>Apply a gas optimization technique. | 5 | CO2 | 3 |
| Q. 3 (b) | Develop a smart contract for a decentralized voting application to allow users to cast votes for different candidates, ensuring security, transparency, and accurate tallying. Utilize Solidity language features, such as data structures and functions, to implement a robust voting system. Additionally, consider gas efficiency and potential challenges related to the Ethereum network while designing your smart contract. Provide code snippets to illustrate key components of your solution. | 5 | CO2 | 3 |