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# B.M.S. College of Engineering, Bengaluru-560019

**Autonomous Institute Affiliated to VTU**

## January / February 2025 Semester End Main Examinations

**Programme: B.E.** **Semester: VII**
**Branch: Computer Science and Engineering** **Duration: 3 hrs.**
**Course Code: 21CS7PEBLC** **Max Marks: 100**
**Course: Blockchain**

**Instructions**:1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

**Important Note:** Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

| | | | UNIT - I | *CO* | *PO* | Marks |
|---|---|---|---|---|---|---|
| 1 | a) | | Discuss Byzantine fault tolerance. Explain it's relevance to blockchain. | *CO1* | *PO1* | **08** |
| | b) | | Explain the three properties of cryptographic hash functions. | *CO1* | *PO1* | **06** |
| | c) | | Demonstrate the steps in creating digital signature using the Elliptic Curve Digital Signature Algorithm. | *CO1* | *PO1* | **06** |
| | | | **OR** | | | |
| 2 | a) | | Discuss the effect of ASIC in crypto currency. | *CO1* | *PO1* | **10** |
| | b) | | Describe the risks associated with centralization in mining. How can the concentration of mining power in a few entities impact the security and decentralization goals of a blockchain network? | *CO1* | *PO1* | **10** |
| | | | **UNIT - II** | | | |
| 3 | a) | | Bring out the differences between hard fork versus soft fork and illustrate the same with an example. | *CO1* | *PO1* | **10** |
| | b) | | Demonstrate with a neat diagram Merkle tree visualization and explain it's relevance to Blockchain. | *CO1* | *PO1* | **10** |
| | | | **OR** | | | |
| 4 | a) | | Compare and list the differences as well as the similarities between private and public Blockchain. | *CO1* | *PO1* | **06** |
| | b) | | Illustrate with an example the complete lifecycle of a transaction in a Blockchain application. | *CO1* | *PO1* | **08** |
| | c) | | Discuss the advantages of Blockchain over the conventional distributed systems. | *CO1* | *PO1* | **06** |
| | | | **UNIT - III** | | | |
| 5 | a) | | Illustrate the execution environment of Ethereum Virtual Machine (EVM) with a neat diagram. | *CO1* | *PO1* | **10** |
| | b) | | Design a smart contract for the following: A bidding application where everyone can send their bids during a bidding period. The | *CO3* | *PO3* | **10** |

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| | | | bids include sending money / ether in order to bind the bidders to their bid. If the highest bid is raised, the previously highest bidder gets his/her money back. | | | |
| | | | **OR** | | | |
| | 6 | a) | Design a smart contract illustrating different methods to send ether from one account to another in solidity. | *CO3* | *PO3* | **10** |
| | | b) | Explain any one vulnerability and demonstrate with an example one attack on the vulnerability. | *CO1* | *PO1* | **10** |
| | | | **UNIT - IV** | | | |
| | 7 | a) | Illustrate with a neat diagram the process of consensus mechanism using GHOST. | *CO2* | *PO2* | **08** |
| | | b) | Discuss the applications of Blockchain in the field of medical record Management System. | *CO1* | *PO1* | **06** |
| | | c) | Illustrate the Bitcoin consensus algorithm which is not vulnerable to Sybil attacks. | *CO2* | *PO2* | **06** |
| | | | **OR** | | | |
| | 8 | a) | Explain Namecoin and show how it is different from Bitcoin. | *CO1* | *PO1* | **10** |
| | | b) | You are a supply chain manager for a retail company looking to enhance transparency and traceability in your supply chain processes. The company is exploring the implementation of a distributed ledger system.<br>Examine how a distributed ledger system can be leveraged to enhance transparency and traceability in the supply chain. What role does the decentralized and immutable nature of a distributed ledger play in ensuring the integrity of supply chain data? | *CO1* | *PO1* | **10** |
| | | | **UNIT - V** | | | |
| | 9 | a) | Explain Nakamoto consensus where the leader is elected and proposes a final value. | *CO2* | *PO2* | **08** |
| | | b) | Differentiate between Proof of Work and Proof of Stake. | *CO2* | *PO2* | **06** |
| | | c) | Show how the high energy consumption in Proof of Work overcome using Proof of Burn. | *CO2* | *PO2* | **06** |
| | | | **OR** | | | |
| | 10 | a) | Discuss difficult level in mining and show how it is calculated. | *CO1* | *PO1* | **10** |
| | | b) | Compare Nakamoto Consensus with alternative consensus mechanisms, such as Proof-of-Stake (PoS) or Proof of Burn. What are the key differences, advantages, and disadvantages of Nakamoto Consensus compared to these alternatives? | *CO2* | *PO2* | **10** |



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