Printed Page:-04 **Subject Code:- ACSAI0601**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VI - THEORY EXAMINATION (2024 - 2025)

Subject: Blockchain Technology and Application Development

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* ***three Sections -A, B, & C.*** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION-A 20

1. Attempt all parts:-

1-a. Where do you store your cryptocurrency? (CO1,K1) 1

(a) Purse
(b) Wallet
(c) Floopy
(d) Bank Account

1-b. Hash is (CO1,K2) 1

(a) A fork
(b) UTXO
(c) takes input of variable length and gives output of fixed length
(d) gas

1-c. Dapp is (CO2,K2) 1

(a) A type of cryptocurrency
(b) A condiment
(c) A type of blockchain
(d) A decentralized application

1-d. Proof of Work consensus algorithm involves solving a computational challenging puzzle (CO2,K2) 1

(a) Sometimes
(b) Never

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(c) TRUE

(d) FALSE

1-e. A consensus mechanism in the context of enterprise blockchain (CO3,K2) 1

(a) The process by which transactions are verified and added to the blockchain

(b) The process by which data is stored on the blockchain

(c) The process by which smart contracts are executed on the blockchain

(d) None of the above

1-f. The role of a consortium in a consortium blockchain (CO3,K1) 1

(a) To own and operate the blockchain network

(b) To develop and maintain smart contracts

(c) To ensure data privacy and security

(d) None of the above

1-g. The main advantage of using blockchain in enterprise applications (CO4,K1) 1

(a) Increased security

(b) Decreased costs

(c) Increased efficiency

(d) All of the above

1-h. The purpose of a blockchain explorer in enterprise blockchain applications (CO5,K1) 1

(a) To provide a user interface for the blockchain application

(b) To track transactions and view data on the blockchain

(c) To execute smart contracts

(d) None of the above

1-i. The role of a peer node in the Hyperledger Fabric network? (CO5,k2) 1

(a) Verify and validate transactions

(b) Order transactions

(c) Execute smart contracts

(d) Manage access control

1-j. The role of a certificate authority (CA) in the Hyperledger Fabric network? (CO5,K2) 1

(a) Manage access control

(b) Order transactions

(c) Execute smart contracts

(d) Validate identity and permissions

2. Attempt all parts:-

2.a. In a blockchain with 1,000 blocks, how many blocks must an attacker control in order to initiate a 51% attack? (CO1,K2) 2

2.b. Define bitcoin Scripts. (CO2,K1) 2

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2.c.	How does the EVM execute smart contracts? (CO3,K2)	2
2.d.	How does Ethereum differ from Bitcoin? (CO4,K2)	2
2.e.	Differentiate between Hyper ledger Indy and Hyper ledger Sawtooth. (CO5,K3)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Define the cryptographic primitives used in the block chain operations.Justify with an example.(CO1,K1)	6
3-b.	In a blockchain network using the Proof of Work (PoW) consensus mechanism, the difficulty level is set such that the hash of each block must start with 4 leading zeros in hexadecimal format. (a) Calculate the probability of a randomly generated hash having 4 leading zeros? (b) On average, how many hashes would the miners need to compute before they find a valid block hash? (CO1,K3)	6
3-c.	Define the concept of the Proof of Burn and Proof of Stake with an example.(CO2,K2)	6
3-d.	Define the role of miners in the process of creating new Bitcoins.(CO2,K2)	6
3.e.	Discuss use cases where permissioned blockchains (e.g., in enterprise settings) offer better privacy, security, and scalability compared to public blockchains. (CO3,K2)	6
3.f.	How do developers test and debug smart contracts on the Ethereum blockchain, and what tools and frameworks are available for this purpose?(CO4,K2)	6
3.g.	Explain the key concepts in Hyperledger Fabric, including identities, policies, channels, and membership. (CO5,K1)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Describe the term Public and Private Block chain with an example.Define the role of the distributed consensus in the block chain network.(CO1,K2)	10
4-b.	Explain the characteristics of the block chain network. Write a case study of the block chain in Supply chain management.(CO1,K3)	10

5. Answer any one of the following:-

5-a.	Expalin pBFT,bitcoin mining and mining difficulty .If the gas limit for a block in Ethereum is 15,000,000 gas, and the average gas price is 20 Gwei, how much ETH will be spent to complete a transaction using the full block capacity? (CO2,K3)	10
5-b.	Explain how miners validate transactions and create new coins as a reward for solving cryptographic puzzles (Proof of Work). Justify the answer with an example.(CO2,K3)	10

6. Answer any one of the following:-

6-a.	Discuss use cases where permissioned blockchains (e.g., in enterprise settings)	10

offer better privacy, security, and scalability compared to public blockchains. (CO3,K2)

6-b. Define the Smart contract and explain crowdfunding and how Blockchain Technology can be used for it? (CO3,K1) 10

7. Answer any one of the following:-

7-a. Define a hard fork in the context of Ethereum, providing examples like the Ethereum Classic fork and its impact on the Ethereum community.Explain the ERC standards.(CO4,K2) 10

7-b. Provide a detailed description of the Ethereum blockchain's components: Ethereum Clients (software like Geth), the Ethereum Network, and the EVM, explaining their roles in transaction validation and contract execution.(CO4,K3) 10

8. Answer any one of the following:-

8-a. Discuss the process of transaction validation in Hyperledger Fabric, focusing on the endorsement policy, ordering, and validation. (CO5,K2) 10

8-b. Define chain code and chain code lifecycle in details. (CO5,K1) 10

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