**Blockchain Question Bank**

**Unit 1**

Ref Textbook : Chapter 1,2,3 “Beginning Blockchain” A Beginner’s Guide to Building Blockchain Solutions — Bikramaditya Singhal Gautam Dhameja Priyansu Sekhar Panda

Chp 1 Mastering Blockchain, Imran Bashir

Blockchain ,Decentralization ,Working of Bitcoin

1. What is Blockchain?

2. Centralized vs decentralized systems

3. Limitations of Centralized Systems

4. Advantages of Decentralized systems over centralized system

5. What are 5 layers of Blockchain?

6. Write a short note on

(i) Application Layer

(ii) Execution Layer

(iii) Semantic Layer

(iv) Propagation Layer

(v) Consensus Layer

7. Why is Blockchain Important? Give some practical use cases of Blockchain

8. Explain: (i) Stream Ciphers (ii) Block Cipher

9. Explain: (i) Symmetric Key Cryptography (ii) Asymmetric/Public Key Cryptography

10. Write a short note on Digital Signature

11. What is the Data Encryption Standard (DES)? Explain One round of DES Cryptography

12. What is a Cryptographic Key and Its properties? Define Public and Private Key

13. Explain RSA with Example

14. What is Hash Function? Explain with Example

15. What are the various SHA-Secured Hash Algorithms

16. What are the applications and advantages of Hash Function

17. What are the various applications of blockchain

18. Explain Byzantine Generals’ Problem

19. Write a short note on Merkle Trees

20. What are the various properties of Blockchain Solutions

21. Write a short note on Blockchain Transactions

22. Explain the Distributed Consensus Mechanisms

23. Write a short note on

(i) Proof of Work

(ii) Proof of Stake

(iii) Proof of Burn

24. What do you mean by Scaling Blockchain? Explain any one of the Scaling Techniques

(i) Off-Chain Computation

(ii) Sharding

25. Define Bitcoin? How is it different from standard government-issued currency?

26. What is Bitcoin? How does it Work?

27. Explain the bitcoin blockchain block structure

28. How is Merkle tree used for blockchain explain with example

29. Write a short note on the genesis block

30. Explain the bitcoin network? How does a new node join the network?

31. Write a short note bitcoin transaction

32. What is Bitcoin Mining?

33. Benefits and limitations of blockchain

34.Challenges and limitations of blockchain technology

**UNIT II**

How Ethereum Works

* + Refer: PPT and <https://ethereum.org/developers/docs/intro-to-ethereum>
  + <https://medium.com/@preethikasireddy/how-does-ethereum-work-anyway-22d1df506369>

1. Explain how Ethereum Blockchain Works.
2. Explain two Types of accounts in Ethereum Blockchain
3. Explain about three different Merkle trie structures in Ethereum
4. Write short note on gas and Payment.
5. Explain transaction and messages in Ethereum
6. Describe fields of block header in Ethereum blockchain
7. Write a short note on EVM( Ethereum Virtual Machine)
8. Write short note on Ommer Blocks
9. Explain Ethereum Smart Contract
10. Explain the consensus mechanism

(PoW) Proof of Work

(PoS) Proof of Stake

(POB) Proof of Burn

**Solidity Programming**

Ref:

[Solidity - Overview (tutorialspoint.com)](https://www.tutorialspoint.com/solidity/solidity_overview.htm)

Doc shared in drive

1. Solidity - Basic Syntax
2. Solidity - First Application
3. Solidity - Comments
4. Solidity - Types
5. Solidity - Variables
6. Solidity - Variable Scope
7. Solidity - Operators
8. Solidity - Loops
9. Solidity - Decision Making
10. Solidity - Strings
11. Solidity - Arrays
12. Solidity - Enums
13. Solidity – Structs
14. Visibility Quantifiers in Solidity
15. Solidity - Mappings
16. Solidity - Conversions
17. Solidity - Ether Units
18. Solidity - Special Variables
19. Solidity Functions
20. Solidity - Functions
21. Solidity - Function Modifiers
22. Solidity - View Functions
23. Solidity - Pure Functions
24. Solidity - Fallback Function
25. Function Overloading
26. Mathematical Functions
27. Cryptographic Functions
28. Solidity - Contracts
29. Solidity - Inheritance
30. Solidity - Constructors
31. Solidity - Abstract Contracts
32. Solidity – Interfaces
33. Difference between Memory and Storage and Stack in Solidity

Ref : [Memory vs storage in Solidity tutorials with examples (w3schools.io)](https://www.w3schools.io/blockchain/solidity-memory-vs-storage/)

UNIT III

Smart Contracts and Token

1. Define Token and types of TOKEN standard in Ethereum

Ref: <https://crypto.com/university/what-are-token-standards>

Explain ERC-20 TOKEN standard

Explain ERC-721 TOKEN standard

Explain ERC-1155 TOKEN standard

Explain ERC-4626 TOKEN standard

Ref: <https://ethereum.org/developers/docs/standards/tokens>

2.What are digital Collectibles

3. What Are the Benefits of Owning Digital Collectibles?

Ref : <https://ucollex.io/blog/what-are-digital-collectibles>

<https://medium.com/crypto-simplified/a-simple-explanation-of-crypto-collectibles-8674c4527bd1>

4. What are Fungible and Non-Fungible Tokens

5.What are the differences between Fungible and Non-Fungible Tokens

6. What is a crypto token?

7.What are the Features of a crypto token

Ref: <https://www.vestinda.com/blog/creating-a-crypto-token-a-step-by-step-guide>

8. How to build and deploy your own ERC-20 token

Ref: <https://www.quicknode.com/guides/ethereum-development/smart-contracts/how-to-create-and-deploy-an-erc20-token>

9.Explain the different tokens available

(payment tokens, stablecoins, utility tokens, security tokens, and non-fungible tokens.)

Blockchain Application Development

Ref Book: “Beginning Blockchain” Chapter 5

1. Explain the steps followed for Interacting with the Bitcoin Blockchain.

(Setup and Initialize the bitcoinjs Library in a node.js Application, Create Keypairs for the Sender and Receiver, Get Test Bitcoins in the Sender’s Wallet ,Get the Sender’s Unspent Outputs ,Prepare Bitcoin Transaction, Sign Transaction Inputs, Create Transaction Hex, Broadcast Transaction to the Network)

1. Explain the steps to Interact Programmatically with Ethereum Blockchain.

(Set Up Library and connection, Set Up Ethereum Accounts, Get Test Ether in Sender’s Account, Prepare Ethereum Transaction, Sign Transaction,

Send Transaction to the Ethereum Network)

1. Explain how to create a smart contract.

(Program the Smart Contract, Compile Contract and Get Details, Deploy Contract to Ethereum Network)

1. Explain Public Nodes vs. Self-Hosted Nodes
2. Differentiate between public, private and Consortium blockchain.
3. Explain the merits and demerits of public, private and Consortium blockchain.

Ref: <https://www.blockchain-council.org/blockchain/types-of-blockchains-explained-public-vs-private-vs-consortium/>

**UNIT IV**

DAPP Deployment

Ref Book : Building Ethereum Dapps -Roberto Infante Manning Publications-

Chapter 1 & Chapter 2

1. Define DAPP. What are the benefits of DApp development
2. What are the drawbacks for Dapp deployment?
3. Difference between Dapps and conventional centralized applications.
4. Explain the structural Anatomy of a Dapp (or) Explain the structural Anatomy of a Voting Dapp.
5. Explain the step by step full cycle of voting transactions.
6. Explain the components of Ethereum node.
7. Explain how an Ethereum node components - JSON-RPC interface, an EVM, a memory pool play a important role in lifecycle of transaction.
8. Explain the Development view of Deploying the voting smart contract.
9. Explain The Architecture of a Web 3.0 application

Ref : [The Architecture of a Web 3.0 application (preethikasireddy.com)](https://www.preethikasireddy.com/post/the-architecture-of-a-web-3-0-application)

1. Explain JSON RPC in detail

Ref: <https://www.wallarm.com/what/what-is-json-rpc>

Uses Cases of Blockchain

Ref Textbook: Chapter 10 : Introducing Ethereum and Solidity

Foundations of Cryptocurrency and Blockchain Programming for Beginners — Chris Dannen

1. Explain the use of Blockchain in The Internet of Ethereum Things.
2. Explain the use of Blockchain in Retail and E-Commerce.
3. Explain the use of Blockchain in Community and Government Financing.
4. Explain the use of Blockchain in Human and Organizational Behavior.
5. Explain the use of Blockchain in Financial and Insurance Applications.
6. Explain the use of Blockchain in Inventory and Accounting Systems.
7. Explain the use of Blockchain in Software Development.
8. Explain the use of Blockchain in Gaming, Gambling, and Investing.
9. Explain the use of Blockchain in Supply chain Management.
10. Explain the role of blockchain in healthcare.