SRM VALLIAMMAI ENGINEERING COLLEGE
(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

QUESTION BANK

VIII SEMESTER

1908807 - BLOCKCHAIN

Regulation – 2019

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Prepared by

Dr. M. Mayuranathan, *Assistant Professor (Sel.Gr.)*

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SUBJECT : 1908807 - BLOCKCHAIN

SEM / YEAR: VIII SEM / IV Year

UNIT – I: INTRODUCTION			
Introduction: Overview of Blockchain, Public Ledgers, Bitcoin, Smart Contracts, Block in a Blockchain, Transactions, Distributed Consensus, Public vs Private Blockchain, Understanding Crypto currency to Blockchain, Permissioned Model of Blockchain, Overview of Security aspects of Blockchain, Basic Crypto Primitives: Cryptographic Hash Function, Properties of a hash function, Hash pointer and Merkle tree, Digital Signature, Public Key Cryptography, A basic cryptocurrency.			
PART – A			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Define Blockchain. Give any two applications.	BTL1	Remembering
2.	Define Bitcoin. Mention any two operations that are performed on a Bitcoin.	BTL1	Remembering
3.	List out the areas in which Blockchain are applied extensively.	BTL1	Remembering
4.	Define Crypto currency with example.	BTL1	Remembering
5.	What is Digital Signature?	BTL1	Remembering
6.	List out the advantage of Cryptocurrency.	BTL1	Remembering
7.	Distinguish Public and Private Blockchain.	BTL2	Understanding
8.	Interpret the advantages of Digital Signature.	BTL2	Understanding
9.	Differentiate centralized and distributed network.	BTL2	Understanding
10.	Give an example for Cryptocurrency application.	BTL2	Understanding
11.	Examine a Cryptography Hash Function.	BTL3	Applying

12.	Illustrate the basic operations carried out in a Public Key Cryptography.	BTL3	Applying
13.	Show the ways in which Merkle tree can be implemented.	BTL3	Applying
14.	Compare hash pointer and Merkle tree and its application in Block chain security.	BTL4	Analyzing
15.	Analyze and write how we can build the trust with blockchain.	BTL4	Analyzing
16.	Analyze and write about the project ideas that you can try by learning Blockchain technology.	BTL4	Analyzing
17.	Show the future scope of blockchain is good, support your justification.	BTL5	Evaluating
18.	Compare between Public Key Cryptography and private key Cryptography.	BTL5	Evaluating
19.	Design a smart contract for any one blockchain application.	BTL6	Creating
20.	Develop the steps which make essential characteristics of a smart contract.	BTL6	Creating
21.	Describe the properties of Hash Function.	BTL2	Understanding
22.	Show the disadvantages of Cryptocurrency over digital currency.	BTL3	Applying
23.	Explain about Transaction.	BTL4	Analyzing
24.	Summarize the areas in which Blockchain are applied extensively.	BTL5	Evaluating
	PART – B		
1.	(i). Describe in detail about Blockchain Technology. (6) (ii). How does Blockchain Works. (7)	BTL1	Remembering
2.	What is a Public Ledger? Describe benefits and application of Blockchain technology. (13)	BTL1	Remembering
3.	(i). Examine the working principal of Smart Contracts. (7) (ii). Examine Project ideas that you can try will learning Blockchain technology. (6)	BTL1	Remembering
4.	(i). Identify the Smart Contracts in Blockchain. (6) (ii). Explain features and capabilities of Smart Contracts. (7)	BTL1	Remembering
5.	Discuss the applications of Smart Contracts and write Advantage and Disadvantages of Smart Contracts. (13)	BTL2	Understanding
6.	(i). What is Block in Blockchain? (4) (ii). Write a working procedure of Blockchain Block. (9)	BTL2	Understanding
7.	Differentiate Public Blockchain and Private Blockchain with an example. (13)	BTL2	Understanding
8.	Explain the application ofSHA-256 algorithm in digital signing verification in detail. (13)	BTL3	Applying
9.	Consider an application like election system, how smart contracts can be done for it. Show and explain with use case diagram. (13)	BTL3	Applying
10.	(i). Analyze and write Working procedure of Public-Key Cryptography. (4) (ii). Analyze and write Relationship between Hashing and Digital Signatures (9)	BT L4	Analyzing

11.	Explain about permissioned model of Blockchain. (13)	BTL4	Analyzing
12.	(i). Analyze the public key cryptography. (9) (ii). Mention its advantages and disadvantages. (4)	BTL4	Analyzing
13.	(i). Explain about Merkle tree. (6) (ii). How does Merkle tree works? (7)	BTL5	Evaluating
14.	Develop the procedure how do Smart Contracts work. (13)	BTL6	Creating
15.	(i). Express the way that mining's relationship to blocks work. (6) (ii). Write procedure for a blockchain to be Public. (7)	BTL2	Understanding
16.	(i).Illustrate are the various cryptocurrency used with the working principle. (6) (ii). Write procedure for how to buy cryptocurrency. (7)	BTL3	Applying
17.	Discuss briefly about Hash pointer and how it is used in Merkle tree. (13)	BTL5	Evaluating

PART – C

1.	Explain why Merkle Trees are Important For Blockchain. (15)	BTL6	Creating
2.	Describe the following i) Need of Public-Key Cryptography. (5) ii) Working On Public-Key Cryptograph. (5) iii) Benefits of Public-key Cryptography (5)	BTL5	Evaluating
3.	Describe about smart contract and it working principle. (15)	BTL5	Evaluating
4.	Write in detail about the food industry is benefited by using blockchain and construct its smart contract. (15)	BTL6	Creating
5.	Discuss about supply chain management is benefited by using blockchain and construct the smart contract for that. (15)	BTL6	Creating

UNIT II - UNDERSTANDING BLOCKCHAIN WITH CRYPTO CURRENCY

Bitcoin and Blockchain: Creation of coins, Payments and double spending, Bitcoin Scripts, Bitcoin P2P Network, Transaction in Bitcoin Network, Block Mining, Block propagation and block relay. Working with Consensus in Bitcoin: Distributed consensus in open environments, Consensus in a Bitcoin network, Proof of Work (PoW) – basic introduction, HashcashPoW, Bitcoin PoW, Attacks on PoW and the monopoly problem, Proof of Stake, Proof of Burn and Proof of Elapsed Time, The life of a Bitcoin Miner, Mining Difficulty, Mining Pool.

PART – A

Q.No	Questions	BT Level	Competence
1.	Define Blockchain.	BTL1	Remembering
2.	What is a Bitcoin?	BTL1	Remembering

3.	Differentiate between Blockchain and Bitcoin.	BTL2	Analyzing
4.	Compare Bitcoin System and Bank System.	BTL2	Analyzing
5.	Who invented bitcoin?	BTL2	Remembering
6.	What are the problems with bitcoin?	BTL3	Applying
7.	What are Bitcoin payments?	BTL4	Analyzing
8.	How to send bitcoin using lightning or the blockchain?	BTL4	Analyzing
9.	How do I receive payment in Bitcoin?	BTL5	Evaluating
10.	List the major companies who accepts Bitcoin as Payment.	BTL6	Remembering
11.	What is Double Spending in Blockchain?	BTL1	Remembering
12.	How does Double Spending happen?	BTL1	Remembering
13.	Illustrate Double Spending with an example	BTL1	Create
14.	List the different types of Double Spending Attacks.	BTL1	Remembering
15.	How Bitcoin Handles Double Spending?	BTL2	Understanding
16.	Classify the different security measures taken to tackle double-spending issues.	BTL3	Applying
17.	Illustrate how a bitcoin handles double-spending.	BTL3	Applying
18.	Explain the solutions to prevent Double Spending.	BTL4	Analyzing
19.	Give the measures that should be taken to combat Double Spending.	BTL5	Evaluating
20.	Describe how successful Double Spending is administered.	BTL6	Creating
21.	Give the disadvantages of Blockchain Concerning Double Spending.	BTL2	Understanding
22.	Explain Bitcoin Script.	BTL3	Applying
23.	What is an OP_CODE or Operation Code?	BTL4	Analyzing
24.	Illustrate bitcoin script with a neat diagram.	BTL5	Creating
	PART – B		
1.	Describe about Bitcoin. Compare Bitcoin and Blockchain. Give the creation of bitcoin. (13)	BTL1	Remembering
2.	(i) What is Double Spending in Blockchain? (7) (ii) Explain how Double Spending happens with an example. (6)	BTL1	Remembering
3.	(i) Explain the types of Double Spending. (4) (ii) How does Bitcoin handle Double Spending? Explain with diagram. (9)	BTL2	Understanding
4.	(i) Describe Bitcoin Script. (6) (ii) Explain OP_CODE or Operation Code. (7)	BTL2	Understanding
5.	Explain the following: (i). Bitcoin Script, the smart contract language of Bitcoin. (5) (ii). Bitcoin P2P Network. (8)	BTL3	Applying
6.	Explain Block mining including the different types of mining. (13)	BTL3	Applying

7.	Explain the following in detail: (i) Mining Bitcoins in Cloud (6) (ii) Mining Bitcoins on your own (7)	BTL5	Evaluating
8.	Explain Block propagation and block relay. Give the uses of Blockchain Mining. (13)	BTL1	Remembering
9.	Describe about working with Consensus in Bitcoin in detail. (13)	BTL1	Remembering
10.	Explain in detail: (i) Proof of Work (7) (ii) Proof of Stake (6)	BTL2	Understanding
11.	Explain Bitcoin's PoW System with its attack types. (13)	BTL4	Analyzing
12.	Discuss Proof of Stake (POS) in detail. (13)	BTL4	Analyzing
13.	Show the following: (i).Proof of Burn. (6) (ii). Proof of Elapsed Time. (7)	BTL4	Analyzing
14.	Describe Mining Pool (Mempool) in detail. (13)	BTL6	Creating
15.	What is Bitcoin Mining Difficulty? How does it work? (13)	BTL2	Understanding
16.	Describe the following: (i). Types of reward systems. (6) (ii). How to start working with mining pools. (7)	BTL3	Applying
17.	Discuss briefly about the largest cryptocurrency mining pools in the world and staking pools. (13)	BTL5	Evaluating
	PART – C		
1.	Explain Bitcoin in detail. (15)	BTL6	Creating
2.	Describe the following i) What is Double Spending in Blockchain? (5) ii) How does Double Spending happen? (5) iii) How Bitcoin handles Double Spending? (5)	BTL5	Evaluating
3.	Describe Bitcoin Script in detail with its Operation Code and objective of its creation. (15)	BTL5	Evaluating
4.	Write in detail about Block Mining. (15)	BTL6	Creating
5.	Discuss Proof of Stake (POS) in detail with its mechanism, features, advantages and disadvantages. (15)	BTL6	Creating

UNIT III - UNDERSTANDING BLOCKCHAIN FOR ENTERPRISES

Permissioned Blockchain: Permissioned model and use cases, Design issues for Permissioned blockchains, Execute contracts, State machine replication, Overview of Consensus models for permissioned blockchain-Distributed consensus in closed environment, Paxos, RAFT Consensus, Byzantine general problem, Byzantine fault tolerant system, Lamport-Shostak-Pease BFT Algorithm, BFT over Asynchronous systems.

PART – A

Q.No.	Questions	BT Level	Competence
1.	Recommend how Permissioned blockchain are evolved.	BTL 5	Evaluating
2.	Recommend how Proper governance structure of Permissioned blockchain has been built.	BTL 5	Evaluating
3.	Define Public blockchain.	BTL 1	Remembering
4.	Create a list of best permissioned blockchain.	BTL 6	Creating
5.	Differentiate Permissioned and Permission less blockchain.	BTL 4	Analyzing
6.	Give the various types of consensus protocol for permissioned blockchain networks?	BTL 2	Understanding
7.	What are the Design Goals to choose the right blockchain consensus protocol?	BTL 1	Remembering
8.	What are Distributed consensus in closed environment?	BTL 1	Remembering
9.	Define consensus in a distributed system.	BTL 1	Remembering
10.	Why distributed consensus is needed.	BTL 6	Creating
11.	Define Byzantine Fault.	BTL 2	Understanding
12.	Summarize the Solutions to achieve Byzantine Fault Tolerance.	BTL 2	Understanding
13.	Differentiate public and private blockchain.	BTL 2	Understanding
14.	Point out the various types of algorithm in distributed concensus.	BTL 4	Analyzing
15.	Illustrate the Paxos Algorithum.	BTL 3	Applying
16.	List out the purposes which implements the preparation phase on paxos algorithm	BTL 1	Remembering
17.	Identify the main thing present in Multi-Paxos algorithm.	BTL 1	Remembering
18.	Illustrate about Raft Algorithm.	BTL 3	Applying
19.	Analyze the properties of permissioned blockchains.	BTL 4	Analyzing
20.	Define a state machine replication.	BTL 3	Applying
21.	Discuss about permissioned blockchain and state machine replication	BTL 2	Understanding
22.	Show the working of pBFT?	BTL 3	Applying
23.	Point out the features of the distributed systems	BTL 4	Analyzing
24.	Explain Byzantine Generals Problem?	BTL 5	Evaluating

PART – B

1.	(i). Write about permissioned blockchain and its benefits (7) (i). Write the different types of blockchain and its differences (6)	BTL 1	Remembering
2.	Explain the following (i).state machine replication (7) (ii). blockchain consensus protocol (6)	BTL 4	Analyzing

3.	(i). Write about byzantine generals problem (6) (ii). Write about Lamport-Shostak-Pease BFT Algorithm (7)	BTL 1	Remembering
4.	Describe in detail about the permissioned blockchain. (13)	BTL 1	Remembering
5.	(i). Discuss in detail the various types of consensus protocol of permissioned blockchain networks. (9) (ii). Discuss the advantage and disadvantage of permissioned blockchain. (4)	BTL 2	Understanding
6.	(i). Create a state machine replication and explain in detail. (7) (ii). Explain the design issues of permissioned blockchain? (6)	BTL 5	Evaluating
7.	i) Construct a public and private network of blockchain and mention its differences. (8) ii) Mention the challenges of permissioned solutions. (5)	BTL 6	Creating
8.	i) Discuss in detail about permissioned blockchain and state machine replication. (7) ii) Explain distributed consensus in closed environment? (6)	BTL 2	Understanding
9.	i) What is paxos and multi-paxos algorithm? (7) ii) Explain raft algorithm and the similarities and differences between the raft and multi-paxos algorithms (6)	BTL 1	Remembering
10.	Analyze in detail about Byzantine Fault Tolerance. (13)	BTL 4	Analyzing
11.	Discuss about the working of pBFT and its limitations. (13)	BTL 2	Understanding
12.	Explain BFT over Asynchronous systems. (13)	BTL 4	Analyzing
13.	Illustrate the benefits of permissioned blockchain (13)	BTL 3	Applying
14.	(i). Illustrate about public, federated, and private blockchain? (7) (ii). Write the list of best permissioned blockchain. (6)	BTL 3	Applying
15.	Discuss about blockchain consensus protocol. (13)	BTL 2	Understanding
16.	Classify the challenges faced by permissioned solutions. (13)	BTL 3	Applying
17.	(i). Explain in detail about federated consensus and PBFT consensus? (6) (ii). Write about Round Robin Consensus. (7)	BTL 5	Evaluating
	PART - C		
1.	(i). Construct and evaluate the Overview of Consensus models for permissioned blockchain. (10) (ii) Compare and assess public and private blockchain. (5)	BTL 5	Evaluating
2.	(i). Develop a Lamport-Shostak-Pease BFT Algorithm. (5) (ii). Develop about paxos algorithm (10) (iii). Develop a RAFT consensus (5)	BTL 6	Creating
3.	i) Draw a state machine and explain its uses (5) ii) What is meant by state machine replication? (5) iii) Difference between permissioned blockchain and state machine replication. (5)	BTL 5	Evaluating
4.	Construct the types of consensus protocols for permission blockchain networks. (15)	BTL 6	Creating

5.	(i). Summarize about design goals to choose the right blockchain consensus protocol. (10) (ii). Explain about variations of pBFT and BFT over asynchronous systems. (5)	BTL 5	Evaluating

UNIT IV - ENTERPRISE APPLICATION OF BLOCK

Cross border payments, Know Your Customer (KYC), Food Security, Mortgage over Blockchain, Blockchain enabled Trade, We Trade – Trade Finance Network, Supply Chain Financing, and Identity on Blockchain.

PART - A

Q.No	Questions	BT Level	Competence
1.	Define KYC.	BTL 1	Remembering
2.	Consider we trade- trade finance network?	BTL 6	Creating
3.	Find out the blockchain in cross-border payments.	BTL 3	Applying
4.	Create the global economy of cross-border payments	BTL 6	Creating
5.	Differentiate blockchain and KYC	BTL 2	Understanding
6.	What is meant by supply chain finance?	BTL 1	Remembering
7.	Give the applications of blockchain in digital identity.	BTL 2	Understanding
8.	Differentiate supply chain financing and KYC	BTL 4	Analyzing
9.	Classify the benefits of blockchain.	BTL 3	Applying
10.	Illustrate the usage of blockchain in today's world.	BTL 3	Applying
11.	What are the working of blockchain mortgage?	BTL 1	Remembering
12.	Define Traditional Mortgage process	BTL 2	Understanding
13.	State the current challenges of blockchain and KYC.	BTL 1	Remembering
14.	Explain the problems of KYC.	BTL 4	Analyzing
15.	Analyze the key problem areas and its solution benefits.	BTL 4	Analyzing
16.	Illustrate the implementation of KYC blockchain implementation.	BTL 5	Evaluating
17.	Assess the benefits of blockchain mortgage.	BTL 5	Evaluating
18.	What is we-trade?	BTL 1	Remembering
19.	Give two applications of supply chain financing.	BTL 2	Understanding
20.	What is blockchain and trade?	BTL 1	Remembering
21.	Discuss about blockchain's contribution to digital identity?	BTL 2	Understanding
22.	Explain food security?	BTL 5	Evaluating
23.	Explain cross border payments.	BTL 4	Analyzing
24.	Illustrate features of blockchain.	BTL 3	Applying

PART - B

1.	Describe in detail about the following. (i). Food security. (7) (ii). Blockchain Mortgage. (6)	BTL 1	Remembering

2.	(i) Consider the ideas behind Blockchain and KYC and explain. (7) (ii). Consider the Challenges and Closing Thoughts on Blockchain for Cross-Border Payments. (6)	BTL 3	Applying
3.	Examine the benefits of food security. (13)	BTL 1	Remembering
4.	Differentiate blockchain and trading. Discuss in detail about the same. (13)	BTL 4	Analyzing
5.	(i). Explain the traditional mortgage process and working of blockchain mortgage. (7) (ii). Show the areas primed for disruption through blockchain. (6)	BTL 4	Analyzing
6.	(i). Discuss the blockchain enabled trade. (7) (ii). Give the benefits of blockchain enabled trade. (6)	BTL 2	Understanding
7.	(i). Illustrate in detail about we trade. (7) (ii). Trace the overview of supply chain finance. (6)	BTL 3	Applying
8.	Compare the improvement of blockchain of supply chain finance. (13)	BTL 1	Remembering
9.	Describe about blockchain and trading. Explain the limitations of blockchain in supply chain finance. (13)	BTL 1	Remembering
10.	Discuss what blockchain can do for digital identity (13)	BTL 2	Understanding
11.	(i). Write the overview of supply chain finance. (7) (ii). Trace the solution of blockchain to digital identity. (6)	BTL 5	Evaluating
12.	Develop the Areas Primed for Disruption through Blockchain and use of blockchain in today's world with its benefits. (13)	BTL 6	Creating
13.	Explain in detail about KYC. (13)	BTL 4	Analyzing
14.	(i). Write short notes on blockchain works for payment. (7) (ii). Express the features of blockchain and the global economy of cross border payments. (6)	BTL 2	Understanding
15.	Discuss the blockchain in cross border payments. (13)	BTL 2	Understanding
16.	Classify the various application of blockchain in real world. (13)	BTL 3	Applying
17.	Explain the My Identity in Blockchain digital solution. (13)	BTL 5	Evaluating
	PART –C		
1.	Consider the supply chain finance and mention some of its advantages in blockchain and the ways in which blockchain boosts supply chain finance. (15)	BTL 5	Evaluating
2.	(i). Formulate the working and implementation of KYC. (8) (ii). Explain the idea behind KYC and its challenges, problems and solutions. (7)	BTL 6	Creating
3.	Using blockchain what are the benefits acquired in food sector. (15)	BTL 6	Creating
4.	i) Explain blockchain mortgage. (7) ii) State the working of blockchain mortgage process and its benefits. (8)	BTL 5	Evaluating
5.	Explain the blockchain enabled trade. (15)	BTL 5	Evaluating

UNIT V - BLOCKCHAIN APPLICATION DEVELOPMENT

Hyperledger Fabric- Architecture, Identities and Policies, Membership and Access Control, Channels, Transaction Validation, Writing smart contract using Hyperledger Fabric, Writing smart contract using Ethereum, Overview of Ripple and Corda.

PART – A

Q.No	Questions	BT Level	Competence
1.	What is Hyperledger fabric?	BTL1	Remembering
2.	Define the workflow of Hyperledger fabric.	BTL1	Remembering
3.	What is meant by updating the ledger?	BTL1	Remembering
4.	List the benefits of Hyperledger fabric.	BTL1	Remembering
5.	Define nodes.	BTL1	Remembering
6.	Identify the types of nodes in blockchain.	BTL1	Remembering
7.	How many actors are in identity management with blockchain?	BTL2	Understanding
8.	Give the different types of system chaincodes?	BTL2	Understanding
9.	Interpret about Corda.	BTL2	Understanding
10.	Distinguish between ripple and bit coin.	BTL2	Understanding
11.	Classify the types of transactions in blockchain.	BTL3	Applying
12.	Apply the industry use cases for Hyperledger fabric.	BTL3	Applying
13.	What are the elements of the architecture relevant to Hyperledger fabric?	BTL3	Applying
14.	Analyze the architecture diagram of the Hyperledger fabric?	BTL4	Analyzing
15.	Point out the overview of ripple digital currency.	BTL4	Analyzing
16.	Compare the difference between ripple and ethereum?	BTL4	Analyzing
17.	Select Why trade ripple with CMC Markets?	BTL5	Evaluating
18.	Summarize the working of Corda.	BTL5	Evaluating
19.	Develop a smart contract using Hyperledger fabric.	BTL6	Creating
20.	How Blockchain brings privacy and security to Identity Management.	BTL6	Creating
21.	Describe the cryptography in identity management.	BTL2	Understanding
22.	Show the problem with current identity management systems.	BTL3	Applying
23.	Explain Identity management.	BTL4	Analyzing
24.	Assess the formation of ledger and block.	BTL5	Evaluating

PART-B

1.	Describe about Hyperledger fabric architecture. (13)	BTL1	Remembering
2.	Examine the components and workflow of Hyperledger fabric (13)	BTL1	Remembering
3.	List the industry use cases for Hyperledger fabric and its benefits. (13)	BTL1	Remembering
4.	Show and explain about the ordering service properties. (13)	BTL1	Remembering
5.	Write about identity management and its problems including the systems that are weak and outdated. (13)	BTL2	Understanding
6.	Interpret about blockchain identity management system. (13)	BTL2	Understanding
7.	Discuss about the privacy and security to identity management. (13)	BTL2	Understanding

8.	(i) Write about decentralized identifiers. (7) (ii) What if some changes happened in decentralized identifiers. (6)	BTL3	Applying
9.	Illustrate to prevent the fraud and identity theft in identity management with blockchain. (13)	BTL3	Applying
10.	Compare membership and access control of blockchain. (13)	BTL4	Analyzing
11.	Analyze about channel used in blockchain. (13)	BTL4	Analyzing
12.	Explain in detail about ripple digital currency. (13)	BTL4	Analyzing
13.	Formulate the creation of smart contract using ethereum. (13)	BTL5	Evaluating
14.	Interpret the different types of chaincodes and the difference between ripple and bit coin. (13)	BTL6	Creating
15.	Interpret about corda and its working. (13)	BTL2	Understanding
16.	Examine smart contract in Hyperledger fabric. (13)	BTL3	Applying
17.	Explain transaction validation. (13)	BTL5	Evaluating
	PART-C		
1.	Mention how to create and join a Hyperledger Fabric channel on Managed Blockchain. (15)	BTL5	Evaluating
2.	Explain Hyperledger fabric in blockchain. (15)	BTL6	Creating
3.	Explain in detail about ripple and corda. (15)	BTL6	Creating
4.	i) Write and explain about checkpoint protocols. (8) ii) Write a blockchain based identity management solution. (7)	BTL5	Evaluating
5.	Interpret the writing smart contract using Hyperledger Fabric. (13)	BTL5	Evaluating