ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)
B.E. / B. Tech - END SEMESTER EXAMINATIONS, APRIL / MAY 2024
Common to ALL Branches
Sixth Semester
IT5693 & Blockchain Technologies
(Regulation 2019)

Time: 3hrs   Max.Marks: 100

CO 1	To provide an introduction to the basic principles of cryptography and To explore the working mechanism of Blockchain technology
CO 2	To learn bitcoin related methodologies.
CO 3	To understand distribution consensus related techniques
CO 4	To explore the emerging technologies in Blockchain networks
CO 5	To develop decentralized applications using various tools

BL – Bloom's Taxonomy Levels
(L1 - Remembering, L2 - Understanding, L3 - Applying, L4 - Analysing, L5 - Evaluating, L6 - Creating)

PART- A (10 x 2 = 20 Marks)
(Answer all Questions)

Q. No	Questions	Marks	CO	BL
1	What is computational security?	2	1	L1
2	Differentiate public and private blockchain networks.	2	1	L5
3	How does blockchain technology prevent the problem of "double spending" in digital currencies such as Bitcoin?	2	2	L5
4	What are the functionalities of a Bitcoin wallet?	2	2	L2
5	What is Meta-mask used for?	2	3	L1
6	Differentiate an Ethereum smart contract and a traditional contract.	2	3	L5
7	What is a chaincode and which languages are supported for writing chaincode in Fabric?	2	4	L1
8	What does the following endorsement policy mean? OR('Org1.member', AND('Org2.member', 'Org3.member'))	2	4	L3
9	State the purpose of ERC20.	2	5	L2
10	What are DApps?	2	5	L1

PART- B (5 x 13 = 65 Marks)
(Restrict to a maximum of 2 subdivisions)

Q. No	Questions	Marks	CO	BL
11 (a)(i)	Describe any one asymmetric public key encryption algorithm used to provide confidentiality.	5	1	L1
(ii)	Given $n = pq = 187$, $e = 7$, $c = 11$ and a side information that $10 < p < q < 20$, determine the original message m.	8	1	L3
OR				
11 (b)(i)	Describe the collision finding experiment and using that describe the desired properties of a cryptographic hash functions.	5	1	L1
(ii)	Imagine you're designing a distributed database system that needs to replicate data across multiple servers for fault tolerance and scalability. Each server in the system stores a portion of the database, and updates to the database need to be replicated to all servers to ensure consistency. However, ensuring consistency in a distributed environment can be challenging due to network partitions, server failures, and concurrent updates. Propose a appropriate consensus algorithm to ensure that all	8	1	L3

			Marks	CO	BL
	servers agree on the order of updates and maintain consistency across the distributed system.				
12 (a)(i)	Write a step by step description of how a bitcoin address is generated.	5	2	L3
(ii)	Suppose Bob is miner, the current block number is 27000 and target 0x00000EF....AF. Write a detailed step by step procedure for Bob to successfully mine the next block 27001.	8	2	L3
	OR				
12 (b)(i)	Draw a Bitcoin blockchain and explain each block fields with its functions.	5	2	L3
(ii)	Suppose Bob the merchant runs a lightweight client and receives the current head of the block chain from a trusted source. What information should Bob's customers provide to prove that their payment to Bob has been included in the block chain? Assume Bob requires 6 confirmations. Describe the working mechanism as well.	8	2	L3
13 (a)(i)	Draw a Ethereum blockchain and explain each block fields with its functions.	5	3	L2
(ii)	Your collaborative industrial organization aims at connecting IoT devices to have more efficient energy production process / energy consumption coordination. Explain with a suitable design and step by step procedure how Ethereum smart contracts can provide support to design the collaborative process.	8	3	L4
	OR				
13 (b)(i)	Explain the working mechanism of Ethereum Virtual Machine with illustrative diagrams.	5	3	L2
(ii)	Your organization aims at conducting student elections using Ethereum. Explain with an abstract design and step by step working mechanism on how it can be done.	8	3	L4
14 (a)(i)	Explain how Web3 API can be used to interact with Ethereum blockchain network.	13	4	L2
	OR				
14 (b)(i)	Explain the working of Hyper ledger Fabric with illustrative diagrams and its components in detail	13	4	L2
15 (a)(i)	Describe a case study on how blockchain technology can be adopted in tea traceability and its supply chain network with suitable blockchain process diagrams and technical specifications.	13	5	L4
	OR				
15 (b)(i)	Describe a case study on how blockchain technology can be adopted in a educational institute for issuing academic credentials (degree, mark sheets) with suitable blockchain process diagrams and technical specifications.	13	5	L4

PART- C (1 x 15 = 15 Marks)
(Q.No.16 is compulsory)

Q. No	Questions	Marks	CO	BL
16 (i)	Suggest which type of blockchain should be used for the security of donations in a charity organization. What benefits does the blockchain technology introduce in such a scenario? Explain your answer using an example	10	5	L6
(ii)	Outline the basic process that should be followed to decide whether a blockchain is needed and if so to decide and which type of blockchain should be used. Justify your design choices for Q. No 16 (i).	5	5	L6