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M.Sc. COMPUTER SCIENCE WITH SPECIALISATION IN DATA SCIENCE

THIRD SEMESTER EXAMINATION, JANUARY 2022

20-359-0315 BLOCK CHAIN TECHNOLOGY

(Regular)

Time : 3 Hours

Maximum Marks:50

(Answer ANY FIVE questions)
Each question carries EQUAL Marks

		QUESTIONS	MARKS	CO	BL	PI
1.	(a)	Consider the set of numbers {2,3,11,16,20,41,4,19}. Construct Merkle tree using the hash function. Hash(x,y) = (x + y) mod 7 if y is odd otherwise Hash(x,y) = (x*y) mod 7 if y is even.	7	CO1	L3	1.6.1
	(b)	Explain the structure of a block in a block chain network.	3		L2	1.6.1
2.	(a)	Create a smart contract named transfer. Sol for the following scenario. A,B,C and D are four different accounts Write function to perform the following . i. Create account holder as the owner with a default balance of 200 ETH (ethers), Account A is permitted to increment as well as burn ETH ii. Create a function purchase_Tokens() which allows accounts B,C and D to buy tokens from account A. iii. Create a function transfer _Token() which allows all other accounts to transfer ETH between each other. iv. Create a function acquire_all() which allows account A to retrieve all amount it has in the smart contract storage before deleting its account.	6	CO2	L4	1.7.1
	(b)	Explain soft fork and hard forks.	4	CO3	L2	2.6.1

3.	(a)	What is the need of consensus protocol in distributed networks such as blockchain? Why consensus is difficult to achieve in message passing systems?	5	CO5	L2	1.6.1
	(b)	Compare consensus protocols : Proof of Work(POW), Proof of Stake (POS), Proof of Elapsed time(POE).	5	CO5	L2	2.6.1
4.	(a)	With a neat block diagram explain HyperLedger architecture and its components.	5	CO6	L2	1.6.1
	(b)	Explain the flow of transaction between two clients belonging to two different organization through a multi-channel network, implementing HyperLedger framework.	5	CO6	L3	1.7.1
5.		Describe a use case for a healthcare system using block chain network.	10	CO7	L3	1.7.1
6.		Describe a use case for a national border security system .	10	CO7	L3	1.7.1
7.	(a)	Compare bitcoin and ethereum network.	3	CO4	L3	2.6.1
	(b)	Design a chain code for changing the ownership of a book. Create a structure Book containing Title, Author, ISBN, Publisher, Year of Publication. Also create a structure Owner with details Owner ID, Name, Address. Create a function to transfer ownership of a book from one user to other user.	7	CO2	L4	1.7.1
