Bk

ti	**Thapar Institute of Engineering & Technology, Patiala (Deemed to be University)**
	Department of Electronics & Communication Engineering
	EST- Written Test

Roll Number: _____ Name: _____

BE- ENC
Date- December 9th, 2022
Time: 03 Hours
Max. Marks: 50

UCS754 / UEC635: Blockchain Technology

Name of Faculty: Dr. Shashikant, Dr. Chandramohan

NOTE: * Attempt all five questions
** Assume any missing information.

Q1. a. Draw the basic architecture of Blockchain showing different layers and explain it highlighting its features. **5**

b. What is consortium blockchain? Explain with a neat and clean diagram. **5**

Q2. a. What is a Merkle Tree and how is it made? Explain why it is used in Blockchain technology. **5**

b. Discuss public key cryptography, its pros & cons and role of digital signatures in the context of integrity of the system. **5**

Q3. a. Differentiate between *Proof of Work (PoW)* and *Proof of Stake (PoS)* consensus mechanisms. **5**

b. What are different types of attacks on *Proof of Work (PoW)* based systems. Discuss. **5**

Q4. What is Byzantine Fault Tolerance and how can it be implemented in Blockchain ? Explain in detail taking example of *Byzantine Generals Problem*. **10**

Q5. The scenario includes two clients, A and B, who are buying and selling radishes using hyperledger. They each have a peer on the network through which they send their transactions and interact with the hyperledger. Outline the transactional mechanics (also known as *Transaction Flow of Hyperledger*) that take place during a standard asset exchange. **10**

********** All the Best**********

Roll Number:_____

Thapar Institute of Engineering & Technology, Patiala

Computer Science & Engineering Department

EST

B.E. (Final Year): Semester- VII (2022/23)	Course Code: UCS754, Course Name: Blockchain Technology and applications
December 09, 2022	Friday, 4:30– 7:30 Hrs
Time: 3 Hours, M. Marks: 40	Name Of Faculty: Dr. Neeraj Kumar

Q1. a) Create a Crowdfunding Smart Contract using Solidity. The manager calls a contract to request funds which the contributors all come together to crowdsource. After crowdsourcing, the manager calls a spending request that more than 50% of the contributor must approve? (6+3)

b) How hash function used in setting up threshold for miners to mine the blocks before they actually become part of the chain? Which data structure is most suitable for linking different blocks in chain?

Q2. Answer the following questions about solidity language (2+2+2+2+2)

a) What is the ABI of the contract?

b) What kinds of memory is used for storing data of a smart contract?

c) In what type of memory are the function parameters stored by default? Can we change the location of the not return parameters? If so, what are the limits for this?

d) What is the difference between memory arrays and storage arrays?

e) What is EV M bytecode?

Q3. a) Explain the process of creating DApps using truffle framework, ganache GUI and web3.0. (4+3)

b) Data immutability and data transparency are key components of any blockchain implementation? How these are achieved in the traditional blockchain framework?

Q4. a) Pete is the pet shop owner who needs a blockchain based web application where he can give away his pets. On the webpage, the clients should be able to see a picture and description of every single pet that Pete has. And, if they have chosen the pet they want to get, they should able do it using the "Adopt" button below the image. Then, the adoption should be recorded on the blockchain, saving the client information, to see later who made these adoptions. For that reason, we need to build a blockchain application to store all the data about the pets and a smart contract to read and write data from the blockchain (business logic). Then, to interact with the blockchain application, we need to build a front-end application. Ethereum and Hyperledger Fabric, both platforms are used to create the discussed blockchain based application. Explain the comparison of these platforms while covering different aspects such as architecture, consensus algorithm, ecosystem, user friendliness, development processes, and implementation difference (front end applications, browser interaction). (6+2)

b) Explain the proof of authority consensus algorithm used in the blockchain for verification and validation of transactions

Q5. a) Define and explain the role of Merkle root in the block header? How it is computed and used in different blocks in the blockchain netwokrs? (2+2+2)

b) How Orphan blocks are created and what are their role in mining the blocks in blockchain networks? How creation of orphan blocks in chain can be handled?

c) Differentiate between Web2.0 and Web3.0 with respect to transaction speed, accuracy and security ?