

<b>Name:</b>	 <b>UPES</b> UNIVERSITY WITH A PURPOSE
<b>Enrolment No:</b>	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, December 2019**

<b>Course:</b> CSBL 1001	<b>Semester:</b> 1st
<b>Program:</b> B. TECH (CSE) + Blockchain	<b>Time:</b> 03 hrs.
<b>Course Code:</b> CSBL 1001	<b>Max. Marks:</b> 100

**Instructions:** (i) Exam is Close Book, (ii) Exchange of mobile phone, calculator or any other item is not allowed, (iii) Start answers to a new question on fresh page, (iv) All parts of a question should be answered together and (v) Scattered part answers will not be evaluated.

**SECTION A**

S. No.		Marks	CO
Q 1	Discuss the importance of blocks, transactions, ledger, users and consensus algorithms in Blockchain.	4	CO1
Q 2	In asymmetric cryptography, private and public keys are generated by key generation mechanism. Can a user have multiple private and public keys. If yes, briefly discuss the scenario.	4	CO2
Q 3	Write a python program to print the users stored in a Block's list.	4	CO3
Q 4	Write output of following python code: <pre>tuple1 = (0 ,1, 2, 3) print(tuple1[1:]) print(tuple1[::-1]) print(tuple1[2:4])</pre>	4	CO1 & CO2
Q 5	Differentiate between consensus algorithms: Proof of Work (PoW), Proof of Authority (PoA), Proof of Authentication (PoAu), Proof of Stake (PoS) and Proof of Concept (PoC).	4	CO1 & CO2

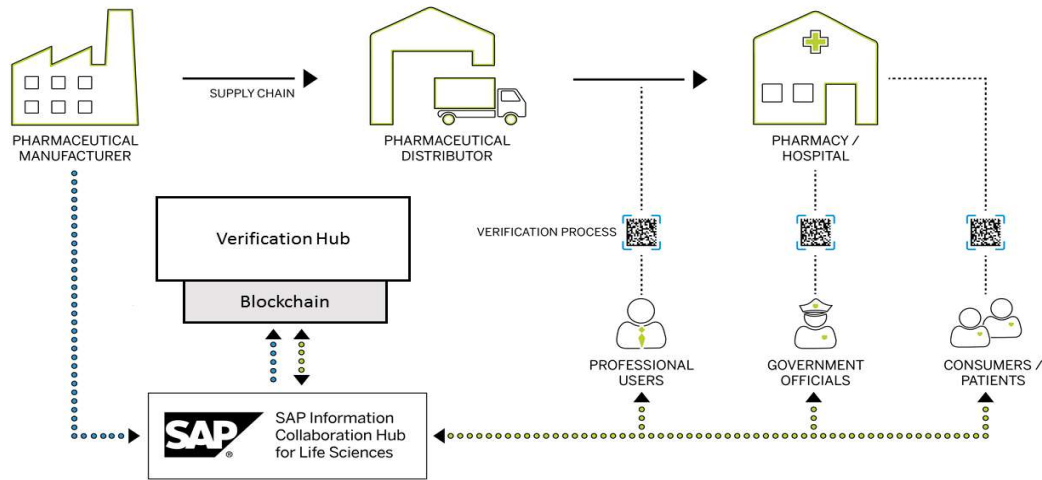
**SECTION B**

Q 6	List the components of Hyperledger and Ethereum tools helpful in creating a blockchain network with an example.	10	CO4
Q 7	Write a Smart contract to print sum of first ten numbers, migrate it to Ethereum and display the result.	10	CO3
Q 8	Discuss various types of wallets and applications in Blockchain network with examples.	10	CO1
Q 9	Write a python program to develop a simple Blockchain Network.  <p style="text-align: center;"><b>OR</b></p> With the help of a neat and clean diagram, discuss the use of Node.js and Web3.js in developing a Blockchain Application. Give example also.	10	CO2

**SECTION-C**

Q 10

Considered the following Drug Supply Chain Management Network:



**Figure: Blockchain in Drug Industry**

- Discuss the possibilities of Blockchain integration with scenario shown in figure 1.
- List various advantages of integrating Blockchain with any stakeholder of scenario shown in figure 1.
- Draw a neat and clean Blockchain Network where blocks, transactions, users and consensus algorithms are integrated with scenario shown in figure 1.
- What are the minimum number of blocks, transactions, users and consensus algorithms required to make the above scenario secure, transparent and trustworthy.

20

CO5

Q11

- Discuss the importance of Smart Contracts in Blockchain Network using following terms: Trust, Accuracy, Speed, Backup, Autonomy, Safety and Saving.
- Discuss two Smart Contract's use cases and its real life applications using Blockchain Network.

OR

Explain the functionalities of following code:

```

class Block{
    constructor(index, data, prevHash){
        this.index = index;
        this.timestamp = Math.floor(Date.now() / 1000);
        this.data = data;
        this.prevHash = prevHash;
    }
}
constructor(index, data, prevHash){

```

20

CO3  
&  
CO4

```

        this.index = index;
        this.timestamp = Math.floor(Date.now() / 1000);
        this.data = data;
        this.prevHash = prevHash;
        this.hash = this.getHash();
    }

    getHash(){
        return sha(JSON.stringify(this.data) + this.prevHash + this.index +
this.timestamp);
    }

    class Blockchain{
        constructor(){
            this.chain = [];
        }
    }

    addBlock(data){
        let index = this.chain.length;
        let prevHash = this.chain.length !== 0 ? this.chain[this.chain.length -
1].hash : 0;
        let block = new Block(index, data, prevHash);

        this.chain.push(block);
    }

    chainIsValid(){
        for(var i=0;i<this.chain.length;i++){

            if(this.chain[i].hash !== this.chain[i].getHash())
                return false;

            if(i > 0 && this.chain[i].prevHash !== this.chain[i-1].hash)
                return false;
        }

        return true;
    }

    const CILCoin = new Blockchain();

    CILCoin.addBlock({sender: "Bruce wayne", reciver: "Tony stark", amount: 100});
    CILCoin.addBlock({sender: "Harrison wells", reciver: "Han solo", amount: 50});
    CILCoin.addBlock({sender: "Tony stark", reciver: "Ned stark", amount: 75});

    console.log(JSON.stringify(CILCoin, null, 4));

```