[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 7971 **L**

Unique Paper Code : 2343010030

Name of the Paper : BLOCKCHAIN AND ITS APPLICATIONS

Name of the Course : **B.Sc. (Hons.) Computer Science – DSE**

Semester : VIII

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. The paper has **two** sections. **All** questions in **"Section A"** are compulsory.
3. Attempt any **four** questions from **"Section B"**.
4. Parts of a question must be answered together.

Section A

1.	**(a)**	Mention any two advantages of using smart contracts over traditional paper-based contracts.	**(2)**
	(b)	Give any two real-world examples where a consortium blockchain is used.	**(2)**
	(c)	How does a distributed ledger ensure trust among participants without a central authority?	**(3)**
	(d)	If one bit of an input to a hash function is changed, does the output change slightly or completely? Name the property that describes this.	**(3)**
	(e)	Which key is used to sign a message and which key is used to verify the signature?	**(3)**
	(f)	What is an orphan block? State one reason why it occurs,	**(3)**
	(g)	Describe any two properties of a hash function.	**(3)**
	(h)	What is a Coin base transaction in Bitcoin?	**(3)**
	(i)	Define Proof of Elapsed Time (PoET).Name one blockchain platform that uses it.	**(4)**
	(j)	List any four applications of blockchain (other than cryptocurrency) and write one line on what each does.	**(4)**

SECTION B

2.	(a)	Explain briefly what is commodity money and digital currency. Give one example of each.	**(7)**
	(b)	What is the difference between a client-server network and a peer-to-peer network? Explain with the help of a diagram.	**(8)**

P.T.O.

3. (a) What is "gas" in Ethereum? Why is it required? (5)

(b) What is a mining pool? Why do miners join a mining pool? (5)

(c) What is difficulty adjustment in Bitcoin? After how many blocks does it happen? (5)

4. (a) Draw a Merkle tree for four transactions T1, T2, T3, T4. Show the hashes at each level up to the Merkle root. (8)

(b) Explain any two SHA-2 hash functions. Which one is used in the Bitcoin blockchain? (7)

5. (a) What is digital signature? Briefly describe the signing and verification steps required in digital signature. (5)

(b) List and explain five application areas of blockchain technology. (5)

(c) Differentiate between a soft fork and a hard fork. Give one real-world example of each. (5)

6. (a) What is Proof of Burn (PoB)? Explain with the help of a suitable example. (5)

(b) What is Proof of Capacity (PoC)? Which resource is used in PoC instead of computing power? (5)

(c) Explain any two differences between Proof of Work (PoW) and Practical Byzantine Fault Tolerance (pBFT). (5)

7. (a) Differentiate between a public blockchain and a private blockchain with the help of suitable example. (7)

(b) Explain Solidity and discuss any four key features that make it suitable for developing smart contracts on the Ethereum blockchain. (8)