

M.E. Computer Science and Engineering (Cyber Security)  
Third Semester  
CSN-8301:Block Chain Technology

Time allowed: 3 Hours

Max. Marks: 50

**NOTE:** Attempt five questions in all, including Question No. 1 (Section-A) which is compulsory and selecting two questions each from Section B-C.

x-x-x

SECTION-A

- Q1 a) How can organizations ensure the security of digital identities, given that biometric data, unlike passwords, cannot be changed once compromised?  
b) How can a P2P network ensure consistency, security and fairness in resource distribution without introducing centralized control points or single points of failure? 10  
c) How effective is blockchain in preventing insurance fraudulent claims?  
d) Does the adoption of blockchain technology risk excluding populations with limited access to digital infrastructure or technical literacy? Explain.  
e) Can energy-intensive consensus mechanisms like Proof of Work be justified in an era of growing environmental concerns and what are the trade-offs of alternatives like Proof of Stake?

SECTION -B

- Q2 a) What is Cryptocurrency?How can decentralized cryptocurrencies address the issue of theft and hacking? What is its relationship with blockchain? 5  
b) How does blockchain technology support cryptocurrencies like Bitcoin and Ethereum? 5  
Q3. How can an organization decide whether to use a public, private, consortium or hybrid blockchain for their specific needs?What are the main challenges in ensuring seamless interoperability between different types of blockchains? 10  
Q4. a) What is the role of blocks in a blockchain, and how are they linked together?  
b) What is a Merkle tree, and why is it used in blockchain systems?  
c) What is the purpose of cryptographic hashing in blockchain architecture?  
d) Why is a consensus mechanism important in blockchain networks? 10  
e) How are transactions stored and validated in a blockchain?

SECTION-C

- Q5. a) What are smart contracts and how are they implemented on the Ethereum network?What is the Ethereum Virtual Machineand why is it essential for running decentralized applications? 5  
b) What are some common use cases for federated blockchains and why are they preferred over public blockchains in certain industries? 5  
Q6. What is Blockchain as a Service (BaaS) and how does it differ from traditional cloud computing services?What are some of the major companies offering BaaS and what platforms do they provide?How can it reduce the cost and complexity of developing and maintaining a blockchain infrastructure for enterprises? 10  
Q7. What are the major limitations of blockchain technology? How does blockchain struggle with scalability and list the challenges arise when trying to process high transaction volumes or large amounts of data and how does this affect storage capacity? 10

x-x-x