Total number of printed pages:02 **Programme(UG)/8th/UCSE812**

2024

BLOCKCHAIN TECHNOLOGY

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. Describe an application use case of Blockchain in any Supply Chain Management system. Provide a suitable architecture diagram to explain the different stakeholders and components of the system. What are the contributions of Blockchain in the improvement of the system? 20

2. a) What is a Merkle Tree? Why is the Merkle Tree root stored in the Block Header? What is the role of Nonce in Block Header? 10

   b) "Blockchains are Transparent and Immutable". Briefly discuss the underlying principles for these properties of Blockchain. 10

3. a) How is the difficulty of mining controlled in PoW? What are the limitations of PoW? How does PoS overcome the limitations of PoW? 20

4. a) What are smart contracts? How do they compare to traditional contracts? What are tokens? 10

   b) What are the key issues inherent in centralized systems that blockchain technology is uniquely positioned to solve, and how does it do so? 10

5. a) In what ways can blockchain be utilized to improve patient data security and interoperability in healthcare systems? Please explain with an example. 10

   b) How might blockchain technology be applied in the energy sector to facilitate peer-to-peer energy trading and support renewable energy sources? 10

6. a) How does integrating IoT devices with blockchain technology enhance data security and reliability in the supply chain? please provide a specific example of its application in a real-world scenario? 10

b) In what ways can blockchain technology be used in connected vehicle systems, and can you give an example of a specific application where blockchain has improved a connected vehicle solution? 10

7 Write short notes on: (any two) 20

a) 51% Attack

b) Double Spending

c) SHA

---xxx---