No. of Printed Pages : **2**

Sl. No.

B3.E9-R5 : BLOCKCHAIN TECHNOLOGY

NOTE :

1. **Answer question 1 and any FOUR from questions 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Total Time : 3 Hours **Total Marks : 100**

1. (a) What are some potential attacks that can occur on a DApp ?

(b) What is DApp Development ?

(c) What are the three main components of the CIA Triad in information security ?

(d) What is the Ethereum Virtual Machine (EVM) and how does it work ?

(e) What are the key properties of bitcoins ?

(f) What is the history of bitcoin and how did it come about ?

(g) Explain the concept of a public key infrastructure and its role in secure communication. **(7x4)**

2. (a) What is the RSA algorithm and how does it work ?

(b) What is the purpose of a hash function in cryptography and what are its properties ?

(c) What is the difference between symmetric and asymmetric cryptography ? **(6+6+6)**

3. (a) What is the difference between a substitution cipher and a transposition cipher ?

(b) How does the Elliptic Curve Digital Signature Algorithm (ECDSA) work and what is its purpose in blockchain technology ?

(c) What is the definition of blockchain and how does it differ from a traditional ledger system ? **(6+6+6)**

4. (a) What are the components of a blockchain ? Briefly explain about each.

(b) How does the CAP theorem relate to the design and operation of blockchain systems ?

(c) Explain centralized, distributed, peer-to-peer, and decentralized blockchain system in brief. **(6+6+6)**

5. (a) What is the purpose of a consensus mechanism in a blockchain system and why is it necessary ?

(b) Explain the "Three Generals Problem" and how it relates to the need for a consensus mechanism in a decentralized system ?

(c) Describe the "Impossibility Theorem" and how it relates to the design of consensus mechanisms in a decentralized system ? **(6+6+6)**

6. (a) How does the proof-of-work consensus mechanism work and what are the incentives for participating in the mining process ?

(b) Explain the proof-of-authority consensus mechanism and how it differs from the proof-of-work consensus mechanism.

(c) How does the Proof-of-Attack models work and what are the challenges it can face in blockchain network ? **(6+6+6)**

7. (a) Discuss the differences between symmetric and asymmetric encryption and the trade-offs between the two.

(b) Discuss the importance of message authentication codes in ensuring the integrity of data in a blockchain.

(c) What are crypto currencies ? Also, discuss the differences between crypto currency and digital cash. **(6+6+6)**

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