


VIT[®]

 Vellore Institute of Technology
Established in the year 1984 under the Vellore Institute of Technology Act, 1984
Final Assessment Test – May 2024

Course: BITE414L - Blockchain Technology

Class NBR(s): 3763

Time: Three Hours

Slot: F2+TF2

Max. Marks: 100

- KEEPING MOBILE PHONE/ELECTRONIC DEVICES EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
 ➤ DON'T WRITE ANYTHING ON THE QUESTION PAPER

 Answer any **TEN** Questions

(10 X 10 = 100 Marks)

1. a) What is CAP theorem and how it works with blockchain? [2]
 b) What is blind signature and how it works with blockchain? [2]
 c) Describe in detail the various ideas that supported bitcoin and blockchain. [6]
2. a) Elaborate the role of Merkle tree in blockchain implementation. [3]
 b) Explain the working of a blockchain in detail. [4]
 c) Enumerate the various tiers of blockchain technology. [3]
- ③ a) Discuss Multiplicative inverse problem in cryptography by considering multiplication modulo 8 table. [3]
 b) What is a block cipher and what are the various modes in which it can be operated? [4]
 c) Find out which of the following are the groups with proper arguments: [3]
 i) $(\mathbb{Z}, -)$ ii) $(\mathbb{N}, +)$ iii) $(\mathbb{I}, *)$
4. a) Explain how private and public keys can be generated in RSA algorithm? [3]
 b) Draw the flow chart for finding the GCD of 2 large numbers and solve $\text{gcd}(1160718174, 316258250)$ [4]
 c) Apply RSA algorithm to encrypt a plaintext M encoded as 88. Assume $p = 17$; $q = 11$ and $e = 7$. [3]
5. a) What is Proof work algorithm and explain with a block diagram to explain how it can be applied to blockchains. [5]
 b) Elaborate the transaction life cycle of proof of work. [5]

6. a) What is cryptocurrency? [3]
b) How proof of stake consensus mechanism can be applied to cryptocurrency? [4]
c) How transactions happen in PoS based cryptocurrency? [3]
7. a) Draw the hyperledger architecture and explain the various layers present in it. [5]
b) Discuss the transaction life cycle of a hyperledger fabric. [5]
8. a) What is ethereum gas? [1]
b) Why is it used in blockchain implementation? [1]
c) Compute the gas fees in ETH units, if we set a gas limit of 30,000 units and the gas price as 20 Gwei. [2]
d) Identify the datatype that is unique in Solidity programming language that is not present in Java and explain. [2]
e) Describe the role of local, global and state variables in blockchain with necessary solidity code. [4]
9. a) Explain how abstract contract and interfaces are implemented in solidity. [5]
Explain them with necessary code.
b) What is a smart contract? [1]
c) How do you write a simple rental contract in Ethereum blockchain using Solidity code? [4]
10. a) Describe in detail how blockchain can be implemented in various e-governance related activities. [5]
b) How smart cities can leverage blockchains? Discuss the benefits that one can derive. [5]
11. Let us elaborate the working of elliptic curve cryptography with necessary example. [10]
12. What is an IDE? How the remix IDE used for Dapp varies from web app IDE such as Eclipse? Why these features are needed for blockchain based apps? [10]

⇔⇔⇔ T/E/TX ⇔⇔⇔