MITE
Invent Solutions

MANGALORE INSTITUTE OF TECHNOLOGY & ENGINEERING
(A Unit of Rajalaxmi Education Trust®, Mangalore)
Autonomous Institute affiliated to VTU, Belagavi, Approved by AICTE, New Delhi
Accredited by NAAC with A+ Grade & ISO 9001:2015 Certified Institution

Model Question Paper
Fourth Semester MCA Degree Examination, 2024-25
Blockchain Technology

Time: 3 Hours **Max. Marks: 100**

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M: Marks, L: RBT (Revised Bloom's Taxonomy) level, C: Course outcomes.

		Module -1	M	L	C
Q1	a.	A logistics company wants to share shipment tracking data among multiple partners without relying on a central server. Make use of the blockchain architecture and explain how to implement and ensure trust.	10	L3	CO1
	b.	You are tasked with simulating a simple blockchain using Python for an educational demo. Apply the core elements (such as blocks, hashes, nonce, previous hash, and transactions) and show how to implement the simulation to mimic a real blockchain.	10	L3	CO1
		OR			
Q2	a.	A company faces frequent downtime due to a single server failure. Apply the distributed nature of blockchain and explain how we can help in achieving higher system availability and fault tolerance in this scenario.	10	L3	CO1
	b.	A cryptocurrency exchange wants to store transaction records in a way that ensures both transparency and security. Make use of blockchain architecture illustrate how it supports these requirements. How can it be applied here in this context?	10	L3	CO1
		Module- 2			
Q3	a.	A green-energy startup wants a blockchain validation method that minimizes power usage while providing security. Apply consensus mechanisms and recommend the most suitable one, explaining why it aligns with the company's environmental goals.	10	L3	CO2
	b.	A blockchain project notices that three mining pools control over 50% of its hash power. Make use of Nakamoto Coefficient and discuss how one can assess this centralization risk. Suggest strategies to improve decentralization.	10	L3	CO2
		OR			
Q4	a.	An NFT marketplace wants to ensure validator rewards are fairly distributed to avoid concentration of power. Apply tokenomics and explain how it can be designed to support this scenario.	10	L3	CO2
	b.	A DeFi project wants to compare its decentralization level with competing platforms. Make use of any quantifiable metrics and discuss how it can be used in this context. How can you measure this?	10	L3	CO2
		Module - 3			
Q5	a.	X wants to confirm the authenticity of the BTC he received from Y. Apply the blockchain property that enables him to do this without a central authority. Write a brief on the same.	10	L3	CO3
	b.	A payment processor needs to prevent double spending on its Bitcoin transactions. Apply Bitcoin's network design and consensus to prevent this problem. Discuss on how this can be achieved.	10	L3	CO3

OR					
Q6	a.	A cryptocurrency exchange wants to store user BTC securely. Apply the key management strategies that could be implemented to ensure maximum safety.	10	L3	CO3
	b.	A business wants faster transaction confirmations than Bitcoin provides. Make use of any alternative cryptocurrencies and write down their advantages.	10	L3	CO3
Module - 4					
Q7	a.	A property sales company wants transactions to execute automatically once payment is confirmed. Apply the smart contract and explain how it could be designed for this process.	10	L3	CO4
	b.	A decentralized application needs to send messages between contracts. Utilize Ethereum transactions and message calls and illustrate how it can be structured to handle this.	10	L3	CO4
OR					
Q8	a.	A startup wants to lower gas costs for its users. Apply Ethereum scaling solutions for this scenario and write a brief on its working.	10	L3	CO4
	b.	A developer wants to minimize gas costs while storing data. Make use of optimization strategies for Ethereum smart contracts and explain how it can be minimized.	10	L3	CO4
Module – 5					
Q9	a.	A bank wants to automate repetitive compliance checks. Apply Robotic Process Automation (RPA) combined with blockchain. How will you achieve this?	10	L3	CO5
	b.	A fleet management system wants real-time vehicle tracking data to be validated. Apply IoT and blockchain technologies and illustrate how both these technologies can be used to work together to achieve the given scenario.	10	L3	CO5
OR					
Q10	a.	A retail company wants to avoid being locked into a single cloud provider. Utilize blockchain-based cloud solutions and explain how to offer more flexibility.	10	L3	CO5
	b.	A HR system wants to verify employee credentials through cloud services. Apply blockchain-based verification. Write down the working with a suitable example.	10	L3	CO5

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