



NPTEL Re-exam  
718123

Bharatiya Vidya Bhavan's  
Sardar Patel Institute of Technology  
Munshinagar, Andheri(W), Mumbai-400058

BE- VII / VIII

NPTEL: Blockchain and Its Applications  
End Semester Examination

VII - ETX / EXT C  
VIII - IT / COM

Date: 7/8/2023

Total: 100 Marks  
Duration: 180 Minutes

**Note:**

- [1] Answer all questions.
- [2] Assume suitable data if necessary stating with clearly.
- [3] Read the each question carefully and follow instructions given for each question if any.
- [4] Keep your answers clear and concise, and state all of your assumptions carefully.

Q. No	Question	Marks
Q.1 a)	Discuss the fundamental elements of a blockchain network and explain how they work together to achieve the core principles of decentralization, immutability, and transparency. Provide examples to illustrate your points.	10
Q.1 b)	Compare and contrast public blockchains and private blockchains, highlighting their respective advantages and limitations.	10
Q.2 a)	Illustrate the process of creating a Digital Signature for a transaction in a blockchain network and explain how it verifies the sender's identity.	10
Q.2 b)	Analyze the scalability challenges faced by early blockchain networks like Bitcoin and the solutions proposed to overcome them.	10
Q.3 a)	Design a conceptual architecture for a supply chain management system using blockchain technology, considering factors like transparency, traceability, and efficiency.  OR How critical are the technical and commercial challenge, scalability, efficiency, privacy, security, interoperability of current blockchain technology?	10
Q.3 b)	Apart from Proof of Work (PoW) and Proof of Stake (PoS) algorithms, which consensus algorithm can provide the maximum transaction throughput in a blockchain system? Justify	10
Q.4. a)	Explain the gas mechanism in Ethereum and how it influences the execution and cost of Smart Contracts. Compare this approach with the transaction endorsement policies used in Hyperledger Fabric.	10
Q.4 b)	What are decentralized applications (DApps)? What has been the usage and why haven't any DApps yet received wide consumer adoption?  OR Illustrate the process of deploying a Smart Contract in both Ethereum and Hyperledger Fabric, highlighting the steps involved and the tools available for	10

	developers.	
Q.5 a)	You are tasked with designing a decentralized identity management system using blockchain technology. Create a high-level architecture for the system, considering the key components, protocols, and security measures.	10
Q5. b)	Discuss the concept of blockchain interoperability and its importance in the context of the broader blockchain ecosystem. Explain the challenges associated with achieving interoperability among different blockchain networks and present potential solutions to overcome these hurdles.	10