



School: Campus:

Academic Year:, Subject Name:, Subject Code:

Semester: Program: Branch: Specialization:

Date:

Applied and Action Learning

(Learning by Doing and Discovery)

Name of the Experiment : PoW vs PoS – Consensus Mechanism Comparison

Objective/Aim:

- To compare **Proof of Work (PoW)** and **Proof of Stake (PoS)** consensus mechanisms in blockchain.
- To understand their differences in **energy consumption, speed, and security**.
- To determine which consensus mechanism is more **sustainable and suitable** for future blockchain networks.
- To understand the **working principles** of both PoW and PoS.

Apparatus/Software Used:

- Language: Python
- IDE: VS Code / Remix IDE
- Blockchain Simulator: Ganache
- Library / Tool: Web3.py

Theory/Concept:

1. Proof of Work (PoW):

- Miners solve complex mathematical puzzles to validate transactions.
- High energy consumption, secure, slower transaction speed.
- Introduced by Bitcoin.

2. Proof of Stake (PoS):

- Validators are chosen based on the number of coins they hold (stake).
- Energy-efficient, faster, and reduces centralization.
- Introduced as an alternative to reduce energy usage.//*

Procedure:

- Set up a blockchain test environment (Ganache or Remix).
- Deploy a smart contract or simulate transactions.
- Run transaction validation using PoW simulation.
- Record time taken and resources used.
- Run the same using PoS simulation.
- Compare speed, energy, and efficiency of both mechanisms.

Observation Table:

Parameter	PoW	PoS	Observation
Energy Used	High	Low	PoS is more energy-efficient
Transaction Speed	Slow	Fast	PoS processes faster
Hardware Requirement	High-end mining rigs	Minimal	PoS requires less hardware
Security Cost	High	Moderate-High Low	Both are secure; PoS is cost-effective

ASSESSMENT

Rubrics	Full Mark	Marks Obtained	Remarks
Concept	10		
Planning and Execution/ Practical Simulation/ Programming	10		
Result and Interpretation	10		
Record of Applied and Action Learning	10		
Viva	10		
Total	50		

Signature of the Student:

Name :

Regn. No. :

Signature of the Faculty: