Centurion University
Shaping Lives... Empowering Communities...

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 Experiement : PoW vs PoS – Consensus Mechanism Comparison

Objective/Aim:

- To understand and compare Proof of Work (PoW) and Proof of Stake (PoS) consensus mechanisms.
- To observe how transactions are validated in both mechanisms.
- To analyze the differences in energy use, security, and decentralization between PoW and PoS.

Apparatus/Software Used:

- Laptop/PC
- Brave browser
- Internet connection
- Notes/documentation tools

Theory/Concept:

- **Consensus Mechanism**: A rule followed by all blockchain nodes to agree on the state of the ledger.

Proof of Work (PoW):

- Miners solve difficult math puzzles using computing power.
- First to solve adds the block and gets rewarded.
- High energy consumption but very secure.
- Example: Bitcoin, Ethereum (before 2022).

Proof of Stake (PoS):

- Validators are chosen based on the number of tokens they “stake” (lock).
- No heavy computation needed, more energy-efficient.
- Randomized selection provides fairness.
- Example: Ethereum 2.0, Cardano, Solana.

Procedure:

- Study the working of PoW (Bitcoin mining simulation).
- Study the working of PoS (validator staking mechanism).
- Compare block validation, transaction confirmation, and energy consumption in both.
- Record the findings in a comparison table.

Observation:

Feature	Proof of Work (PoW)	Proof of Stake (PoS)
Energy Use	Very high (computers mining)	Very low (no mining, just staking)
Validation	Solving puzzles by miners	Random validators selected
Reward System	Block reward + transaction fees	Transaction fees + staking reward
Hardware Requirement	Expensive mining rigs (ASIC/GPU)	Normal computer with coins staked
Security	Strong, but risk of 51% attack	Strong, but risk of stake monopoly
Examples	Bitcoin, old Ethereum	Ethereum 2.0, Cardano, Solana

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 :

Signature of the Faculty:

Regn. No. :

**As applicable according to the experiment.*
Two sheets per experiment (10-20) to be used.