Centurion University

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, analyze, and compare the functioning, benefits, limitations, and efficiency of **Proof of Work (PoW)** and **Proof of Stake (PoS)** consensus mechanisms used in blockchain networks.

Apparatus/Software Used:

- Laptop/PC
- Word for documentation
- Brave browser for research

Theory/Concept:

1. Proof of Work (PoW)

- **Definition:** A blockchain consensus mechanism where miners compete to solve complex cryptographic puzzles.
- **Purpose:** To validate transactions and add new blocks to the blockchain.
- **Working:**
  1. Miners use high computational power to solve mathematical problems.
  2. The first miner to solve the puzzle adds the block to the chain and earns rewards.
- **Examples:** Bitcoin, Litecoin.

2. Proof of Stake (PoS)

- **Definition:** A blockchain consensus mechanism where validators are selected based on the amount of cryptocurrency they lock as collateral (“stake”).
- **Purpose:** To secure the network and validate transactions using minimal energy.
- **Working:**
  1. Validators are chosen randomly, with selection probability increasing with higher stakes.
  2. Fraudulent activity can result in loss of staked funds.
- **Examples:** Ethereum 2.0, Cardano, Polkadot.

Procedure:

- Research PoW and PoS mechanisms using blockchain whitepapers, technical blogs, and case studies.
- Study the operational principles and validation steps of both mechanisms.
- Identify and list their advantages, disadvantages, and security features.
- Compare both mechanisms based on **energy usage, transaction speed, scalability, and security**.
- Organize findings into a comparison table for clear understanding.

Observation Table:

Parameter	Proof of Work (PoW)	Proof of Stake (PoS)
Selection Method	Puzzle-solving competition	Validators chosen by coin stake
Energy Usage	High	Low
Transaction Speed	Slow	Fast
Security	Very High	High
Examples	Bitcoin, Litecoin	Ethereum 2.0, Cardano, Polkadot

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: