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 : Stake Your Claim – Proof of Stake Simulation

Objective/Aim:

To simulate and understand the working of the **Proof of Stake (PoS)** consensus mechanism used in blockchain networks for validating transactions and creating new blocks.

Apparatus/Software Used:

- VS code
- Brave for searching
- MetaMask wallet

Theory concept:

Proof of Stake (PoS) is a blockchain consensus mechanism where validators are chosen to create new blocks based on the number of tokens they "stake" or lock as collateral. Unlike Proof of Work (PoW), which relies on computational power, PoS selects validators probabilistically — the higher the stake, the higher the chance of being chosen.

Key Concepts:

- Stake: The amount of cryptocurrency locked by a participant to participate in block validation.
- Validator: A node selected to create the next block.
- Block Proposal: The process where the selected validator adds a new block.
- Random Selection: Validators are chosen randomly but weighted by their stake.
- Rewards: Validators earn rewards for honest participation.

Procedure:

- **Setup Environment:** Install Python or Node.js and prepare your coding environment.
- **Create Validator List:** Define several validators, each with different staking amounts.
- **Assign Stakes:** Assign token values (e.g., Validator A – 50 tokens, B – 30 tokens, C – 20 tokens).
- **Simulate Block Selection:** Randomly select one validator to propose a block, with probability proportional to their stake.
- **Record Result:** Note which validator was selected in each round.
- **Repeat Simulation:** Run multiple rounds to observe fairness and distribution of selections.
- **Calculate Statistics:** Count how many times each validator was chosen and compare with their stake ratio.
- **Analyze Results:** Check if validators with higher stakes were selected more frequently.

Initial Stakes:

Node A: 50
Node B: 30
Node C: 20

Simulation Result:

Round 1 → Selected Validator: Node A (Reward +10)
Round 2 → Selected Validator: Node B (Reward +10)
Round 3 → Selected Validator: Node A (Reward +10)
Round 4 → Selected Validator: Node C (Reward +10)

Final Stakes:

Node A: 70
Node B: 40
Node C: 30

Observation:

The experiment illustrates that Proof of Stake replaces mining competition with probabilistic selection based on stake. This reduces energy usage, speeds up transaction validation, and maintains network security.

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.