	School: .... Campus: ....
Centurion UNIVERSITY Shaping Lives... Empowering Communities...	Academic Year: .... Subject Name: .... Subject Code: ....
	Semester: .... Program: .... Branch: .... Specialization: ....
	Date: ....

Applied and Action Learning
(Learning by Doing and Discovery)

Name of the Experiement :   Multi-Chain Deploy – BSC or Layer 2 Experience

Objective/Aim:

To study and understand the differences, advantages, and disadvantages between Web2 and Web3, and explore the evolution of the internet.

Apparatus/Software Used:

- Laptop/PC
- RemixIDE
- Internet for research

Theory/Concept:

a. Multi-Chain Concept:

A **multi-chain deployment** means deploying the same smart contract on multiple blockchain networks.
It ensures interoperability, scalability, and lower transaction costs.

b. BSC (Binance Smart Chain):

- EVM-compatible blockchain developed by Binance.
- Supports smart contracts and uses **BNB** for gas fees.
- Faster block times (~3 seconds) and lower gas fees compared to Ethereum.

c. Layer-2 Solutions:

Layer-2 blockchains are built on top of Ethereum to improve scalability and reduce costs.
Common examples:

- **Polygon (Matic)**
- **Arbitrum**
- **Optimism**

These networks use rollups or sidechains to process transactions efficiently.

Procedure:

Step 1: Compile the contract in Remix IDE
Step 2: Connect MetaMask → Networks → Add Custom RPC
Step 3: Deploy contract using "Injected Provider - MetaMask"
Step 4: Verify the contract addresses on BscScan / PolygonScan

```solidity
// SPDX-License-Identifier: MIT
+ S
pragma solidity ^0.8.0;

contract MultiChainHello {
    string public message;

    constructor() {     ⛽ infinite gas 316400 gas
        message = "Hello, Blockchain World!";
    }

    function updateMessage(string memory newMsg) public {     ⛽ infinite gas
        message = newMsg;
    }
}
```

Observation:

- Ethereum network consumed the highest gas fee due to congestion.

- BSC and Polygon were much faster and economical.

- Contract address remained consistent in logic but different across chains.

- Multi-chain deployment provides scalability and better user experience.

- Layer-2 deployment improves transaction throughput drastically

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**		