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NPTEL

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Courses » Blockchain Architecture Design and Use Cases

Announcements

**Course**

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## Unit 6 - Week 3 :

## Unit 3

Register for  
Certification exam

### Course outline

How to access  
the portal

Prerequisite

Week 1 : Unit 1

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Week 3 : Unit 3

● Lecture 11 :  
Consensus in  
Bitcoin – I (The  
Basics)

● Lecture 12 :  
Consensus in  
Bitcoin – II  
(PoW and  
Beyond)

● Lecture 13 :  
Consensus in  
Bitcoin – IV  
(The Miners)

● Lecture 14 :  
Permissioned  
Blockchain – I  
(Basics)

● Lecture 15 :  
Permissioned  
Blockchain – II  
(Consensus)

### Assignment 3

The due date for submitting this assignment has passed.

As per our records you have not submitted this  
assignment.

**Due on 2019-02-20, 23:59 IST.**

1) Say, at some instance three independent miners propose the following three blocks (containing the transactions enclosed in []) **1 point**  
 B1=[T100, T102, T104, T105],  
 B2=[T100,T102,T103],  
 and B3=[T100, T102,T103,T104,T105].  
 If the consensus algorithm is Proof of Work (PoW). Which of these block likely to get included in the chain once the network achieves consensus, given the last block in the blockchain has transactions T98, T99 and T101?

- ☐ B1
- ☐ B2
- ☐ Each of these blocks have equal chances to get added to the blockchain
- ☐ Either B2 or B3

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*Each of these blocks have equal chances to get added to the blockchain*

2) Which of the following components of the block header has to be obtained to satisfy the difficulty posed by the blockchain network (consider PoW consensus mechanism)? **1 point**

- ☐ Merkle tree root
- ☐ Nonce
- ☐ Timestamp
- ☐ Previous block hash

**No, the answer is incorrect.**

**Score: 0**

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☐ Restricting the block size  
☐ Diversification of the network with no outbound connections from a single IP  
☐ Diversification of the network with a single outbound connections from a single IP

**No, the answer is incorrect.**  
**Score: 0**

**Accepted Answers:**  
*Diversification of the network with a single outbound connections from a single IP*

4) Considering the Proof of Elapsed Time (PoET) adapted in Hyperledger Sawtooth framework, which of the following mechanisms is used to ensure that the miner (or block leader) is a legitimate participant and not an attacker and has waited for the random amount of time assigned by the network? **1 point**

☐ By verifying the acquired stake that the user has obtained by consuming the given random amount of time  
☐ By verifying the amount of bitcoins send to a verifiable un-spendable address  
☐ By ensuring that the trusted regions of the code are run in Trusted Execution Environments (TEE) and the user cannot tamper it  
☐ By ensuring that the nonce is very difficult to obtain and the user wastes enough time for it

**No, the answer is incorrect.**  
**Score: 0**

**Accepted Answers:**  
*By ensuring that the trusted regions of the code are run in Trusted Execution Environments (TEE) and the user cannot tamper it*

5) Suppose at a given instance the difficulty set by the BitCoin network is 56, with the last 2016 blocks mined in 11 days. What will be the next computed value of the difficulty [use ceiling to round off to the next integer]? **1 point**

☐ 72  
☐ 75  
☐ 69  
☐ 71

**No, the answer is incorrect.**  
**Score: 0**

**Accepted Answers:**  
 72

6) With mining pools in effect, which of the following problem or problems may appear in the BitCoin network: **1 point**

☐ Monopoly in mining  
☐ Participation of smaller miners with lesser resources  
☐ Discouragement among miners to fully complete the task posed by the network  
☐ There are disadvantages with this scheme

**No, the answer is incorrect.**  
**Score: 0**

**Accepted Answers:**  
*Monopoly in mining*  
*Discouragement among miners to fully complete the task posed by the network*

7) What are the primary assumptions behind a permissioned blockchain network? **1 point**

☐ No need of consensus

- ☐ Users are not malicious
- ☐ Users are known apriori
- ☐ The network is closed

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Users are known apriori*

*The network is closed*

8) Which of the following ensure ordered sequential execution of transactions in a permissioned blockchain network?

1 point

- ☐ The incorporation of domain specific language (DSL)
- ☐ The underlying consensus algorithm
- ☐ The broadcasted state information
- ☐ None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

*The underlying consensus algorithm*

*The broadcasted state information*

9) Suppose in a distributed network, running Paxos as the underlying consensus algorithm, has 3 proposers and 5 acceptors and 1 learner. Say, 3 of the acceptors have failed, which of the following is true about the network?

1 point

- ☐ A value gets accepted by default
- ☐ Someone else becomes proposer
- ☐ None of the proposers get a reply
- ☐ A new value gets proposed

No, the answer is incorrect.

Score: 0

Accepted Answers:

*None of the proposers get a reply*

10) Say, 5 nodes (with ids 1..5) contribute to a distributed system. During the process of reaching consensus, a proposal is suggested by node 4 with a proposal number 103. In similar fashion, a proposal is suggested by node 3 with a proposal number 111. Node 2 being a malicious node immediately makes another proposal with a proposal number 117. What will be final state of the system after the consensus is reached (consider PAXOS as the underlying consensus algorithm)?

1 point

- ☐ Proposal 103 from node 1 will be considered finally
- ☐ Blocking proposal 117 and accepting proposal 111 finally
- ☐ Proposal 117 from node 1 will be considered finally
- ☐ Nodes 2, 3, and 5 will wait for sometime and one of them will become a proposer

No, the answer is incorrect.

Score: 0

Accepted Answers:

*Blocking proposal 117 and accepting proposal 111 finally*

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