

## DeFi and Financial Engineering – Quiz

Cryptoeconomics

## Question 1

### What is DeFi?

- A. Default Finance
- B. Financial services built on blockchain without traditional intermediaries
- C. Decrypted Finance
- D. A cryptocurrency exchange

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**Answer: B**

DeFi provides financial services like lending, trading, and borrowing through smart contracts, removing traditional intermediaries.

## Question 2

**What is an AMM (Automated Market Maker)?**

- A. A trading bot
- B. An algorithm that provides liquidity and determines prices via mathematical formulas
- C. A centralized exchange
- D. A wallet type

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**Answer: B**

AMMs use algorithms and liquidity pools to enable trading without order books, with prices determined by formulas like  $x*y=k$ , where  $x$  and  $y$  are token reserves and  $k$  is the constant product.

## Question 3

**What is the constant product formula  $x*y=k$  used for?**

- A. Mining difficulty
- B. Determining token prices in AMM liquidity pools
- C. Transaction fees
- D. Wallet addresses

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**Answer: B**

In  $x*y=k$ ,  $x$  = reserve of token A,  $y$  = reserve of token B. Trading changes ratios while  $k$  stays constant. Example: If  $x=100$  ETH and  $y=200,000$  USDC,  $k=20,000,000$ .

## Question 4

**What is 'impermanent loss'?**

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- B. Potential loss from providing liquidity when prices diverge
- C. Transaction fees
- D. Network downtime

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**Answer: B**

Impermanent loss occurs when pooled asset prices diverge from deposit ratios. Called 'impermanent' because it reverses if prices return to original ratio, but becomes realized loss upon withdrawal.

## Question 5

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- C. A crypto wallet
- D. A staking platform

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**Answer: B**

Liquidity pools are smart contracts containing token pairs that enable decentralized trading on AMMs.

## Question 6

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- A. Agricultural tokens
- B. Maximizing returns by moving assets between DeFi protocols
- C. Mining cryptocurrency
- D. Staking tokens

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**Answer: B**

Yield farming involves strategically providing liquidity or staking across protocols to maximize token rewards.

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- C. Token price
- D. Transaction fees collected

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**Answer: B**

TVL measures the total value of crypto assets deposited in DeFi protocols, indicating adoption and trust.

## Question 8

**What is a 'flash loan'?**

- A. A fast bank transfer
- B. An uncollateralized loan that must be repaid within one transaction
- C. A quick trading strategy
- D. A type of stablecoin

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**Answer: B**

Flash loans allow borrowing without collateral if the loan is repaid in the same transaction block.

## Question 9

**What is 'collateralization' in DeFi lending?**

- A. Working together
- B. Locking assets as security for a loan
- C. Trading fees
- D. Network validation

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**Answer: B**

Collateralization requires depositing assets worth more than the loan value to protect lenders.

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**Answer: B**

Liquidation occurs when collateral value falls below the required ratio, triggering automatic sale to repay debt.

### What is Uniswap?

- A. A hardware wallet
- B. A decentralized exchange using AMM model
- C. A centralized exchange
- D. A stablecoin protocol

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- B. A decentralized exchange using AMM model
- C. A centralized exchange
- D. A stablecoin protocol

**Answer: B**

Uniswap is a leading DEX using AMM model with liquidity pools, pioneering decentralized trading.

**What is 'slippage' in DeFi trading?**

- A. Network errors
- B. Difference between expected and actual trade price
- C. Transaction fees
- D. Wallet sync issues

## Question 12

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**Answer: B**

Slippage is the price difference between order placement and execution, larger in low-liquidity pools.

## Question 13

**What is an LP token?**

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- C. A governance token
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**Answer: B**

LP tokens represent a provider's proportional share of a liquidity pool and can be redeemed for underlying assets.

## Question 14

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- B. Ability to combine and build upon different protocols like Lego blocks
- C. Transaction speed
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**Answer: B**

Composability allows DeFi protocols to interact and build on each other, creating complex financial products.

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DEX aggregators like 1inch route trades through multiple exchanges to find optimal prices.

**What is 'over-collateralization' ?**

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- B. Requiring collateral worth more than the loan (e.g., 150%)
- C. Extra transaction fees
- D. Network redundancy

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**Answer: B**

Over-collateralization protects lenders by requiring borrowers to deposit more value than borrowed.

## Question 17

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### Answer: B

Aave is a leading DeFi protocol for decentralized lending, borrowing, and flash loans.

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- A. Inflation
- B. Smart contract vulnerabilities and exploits
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**Answer: B**

DeFi protocols can have bugs or vulnerabilities in smart contracts that attackers can exploit.

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- D. A protocol upgrade

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**Answer: B**

A rug pull is a scam where project creators suddenly withdraw liquidity or funds, leaving users with worthless tokens.

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- D. Locked liquidity

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**Answer: B**

Concentrated liquidity allows LPs to provide liquidity within custom price ranges, improving capital efficiency.

## Question 21

**You provide liquidity to an ETH/USDC pool when ETH = 2,000. You deposit 1 ETH + 2,000 USDC. ETH price rises to 3,000. If you had just held the assets, you'd have 5,000 (1 ETH @ 3,000 + 2,000 USDC). Using the constant product formula, your pool share is now worth approximately 4,899. What is your impermanent loss?**

- A. 0 – no loss occurred
- B. 101 or approximately 2.0
- C. 1,000 or 20
- D. 500 or 10

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**Answer: B**

Impermanent loss = 5,000 (HODL value) – 4,899 (pool value) = 101.0

## Question 22

**A DeFi lending protocol experiences a sudden 30% ETH price crash. User A has health factor 1.8, User B has health factor 1.3, User C has health factor 1.05. Liquidation threshold is health factor  $\geq 1.0$ . Assuming all users have ETH collateral and USDC debt, which users face liquidation?**

- A. User C only - already close to threshold
- B. Users B and C - both below safety margin
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- A. User C only - already close to threshold
- B. Users B and C - both below safety margin
- C. All users - 30% crash affects everyone
- D. User C only, possibly User B depending on exact ratios

**Answer: D**

Health factor = (Collateral Value  $\times$  Liquidation Threshold) / Debt Value. A 30% ETH crash reduces collateral value by 30%. User A:  $1.8 \times 0.7 = 1.26$  (safe). User B:  $1.3 \times 0.7 = 0.91$  (liquidated). User C:  $1.05 \times 0.7 = 0.735$  (liquidated). This shows why DeFi users maintain health factors  $\geq 1.5$  and why cascading liquidations occur during flash crashes.

## Question 23

**A yield farm offers 400% APR in governance tokens. The pool has 10M TVL. Annual token emissions needed to sustain this rate are 40M worth of tokens. If token price depends on demand but supply is inflating rapidly, what is the most likely outcome after 6 months?**

- A. Sustainable returns as more users join
- B. Death spiral: token price crashes, real APR collapses, TVL exits
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**Answer: B**

Classic yield farming death spiral: 1) High APR attracts mercenary capital. 2) 40M/year token emissions creates sell pressure. 3) Token price drops, reducing real APR. 4) Farmersexit, dumping tokens. 5) Price crashes further, TVL flees. APR > 100

## Question 24

**Protocol X has a flash loan vulnerability: an attacker can borrow 50M in stablecoins, manipulate a price oracle by draining a low – liquidity pool, exploit the distorted price to extract 10M, and repay the flash loan—all in one transaction. Gas cost is 500. What is the minimum smart contract change to prevent this?**

- A. Increase flash loan fees to 10M
- B. Use time-weighted average price (TWAP) oracle instead of spot price
- C. Require collateral for flash loans
- D. Disable flash loans entirely

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- B. Use time-weighted average price (TWAP) oracle instead of spot price
- C. Require collateral for flash loans
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**Answer: B**

TWAP oracles average prices over time (e.g., 30-minute window), making them resistant to single-transaction manipulation. Option A doesn't work - attacker profits 10M, would pay fees. Option C defeats flash loan purpose. Option D removes legitimate use cases. Real solution: TWAP + liquidity – weighted oracles (Chainlink, Uniswap V3 TWAPs). Most DeFi exploits stem from spot price oracle manipulation.

## Question 25

**You're evaluating two yield strategies. Strategy A: Provide ETH/USDC liquidity on Uniswap V3 (concentrated range), earn 30% APR in fees, but exposed to impermanent loss. Strategy B: Lend USDC on Aave at 5% APR, borrow ETH at 3% (net cost -3% on borrowed amount = 50% of position), loop 2x for leveraged ETH exposure. Which has higher risk-adjusted return if you expect ETH to appreciate 20% annually?**

- A. Strategy A - higher base APR compensates for IL
- B. Strategy B - leveraged exposure captures more upside
- C. Strategy A - simpler and more predictable
- D. Strategy B - but only if ETH appreciates  $\geq 15\%$  to offset borrow costs

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- C. Strategy A - simpler and more predictable
- D. Strategy B - but only if ETH appreciates  $\geq 15\%$  to offset borrow costs

### Answer: D

Strategy A: 30% APR -  $\sim 5\%$  IL (from 20% price move) = 25% net. Strategy B: 5% lending + (2x  $\times$  20% ETH gain) - (1x  $\times$  3% borrow) = 5% + 40% - 3% = 42% gross. BUT: liquidation risk if ETH drops  $\geq 30\%$ , smart contract risk, gas costs. Strategy B wins on returns if ETH appreciates as expected, but carries significantly higher risk (leverage, liquidation). Risk-adjusted: Strategy A is safer; Strategy B for risk-tolerant users.

## Question 26 (True/False)

**AMMs require order books to function.**

- A. True
- B. False

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- A. True
- B. False

**Answer: False**

AMMs (Automated Market Makers) use liquidity pools and mathematical formulas like  $x*y=k$  instead of order books. This is a key difference from traditional exchanges.

## Question 27 (True/False)

**Impermanent loss only occurs when prices change.**

- A. True
- B. False

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**Impermanent loss only occurs when prices change.**

- A. True
- B. False

**Answer: True**

Impermanent loss happens when the price ratio of pooled assets changes from when they were deposited. If prices return to original ratios, the loss disappears.

## Question 28 (True/False)

**Stablecoins always maintain exactly 1value.**

- A. True
- B. False

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**Stablecoins always maintain exactly 1 value.**

- A. True
- B. False

**Answer: False**

Stablecoins are designed to maintain 1 value but can deviate — peg due to market conditions, collateral issues, or loss of confidence. Examples include UST collapse (2022) and USDC de-peg (March 2023).

## Question 29 (True/False)

**Oracles bring off-chain data to smart contracts.**

- A. True
- B. False

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**Oracles bring off-chain data to smart contracts.**

- A. True
- B. False

**Answer: True**

Oracles are services that provide external real-world data (prices, weather, events) to blockchain smart contracts, bridging on-chain and off-chain worlds.

## Question 30 (True/False)

**TVL measures total assets locked in DeFi protocols.**

- A. True
- B. False

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- A. True
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**Answer: True**

TVL (Total Value Locked) measures the total value of crypto assets deposited in DeFi protocols, indicating adoption and trust.

## Question 31 (True/False)

**DEXs require user identity verification.**

- A. True
- B. False

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**DEXs require user identity verification.**

- A. True
- B. False

**Answer: False**

Decentralized exchanges (DEXs) are permissionless and don't require KYC/identity verification. Users interact directly with smart contracts, unlike centralized exchanges.

## Question 32 (True/False)

**Flash loans require collateral.**

- A. True
- B. False

## Question 32 (True/False)

**Flash loans require collateral.**

- A. True
- B. False

**Answer: False**

Flash loans are uncollateralized loans that must be borrowed and repaid within the same transaction. If repayment fails, the entire transaction reverts.

## Question 33 (Fill in the Blank)

**Total value locked is abbreviated \_\_\_\_.** *Hint: Three letters...*

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TVL (Total Value Locked) measures the total value of crypto assets deposited in DeFi protocols.

## Question 34 (Fill in the Blank)

\_\_\_ **loss occurs when prices change in liquidity pools.** *Hint: It can reverse if prices return...*

## Question 34 (Fill in the Blank)

\_\_\_ **loss occurs when prices change in liquidity pools.** *Hint: It can reverse if prices return...* **Answer: Impermanent**

Impermanent loss occurs when pooled asset prices diverge from deposit ratios. It's called 'impermanent' because it reverses if prices return to original ratios.

## Question 35 (Fill in the Blank)

**AMM stands for Automated Market \_\_\_\_.** *Hint: Creates markets automatically...*

## Question 35 (Fill in the Blank)

**AMM stands for Automated Market \_\_\_\_.** *Hint: Creates markets automatically...* **Answer: Maker**

AMM (Automated Market Maker) uses algorithms and liquidity pools to enable trading without order books.