

BCT - UNIT 4 (Cryptocurrency – Bitcoin, and Token) – END-SEM PYQ Answers➤ **MAY / JUN 2023****Q3) a) Write a note on Bitcoin. [6]**

Bitcoin is a **decentralized digital currency** that allows peer-to-peer transactions without the need for intermediaries like banks or governments. It was introduced by **Satoshi Nakamoto in 2009** as an open-source project, marking the beginning of the cryptocurrency era.

- Bitcoin works on a **blockchain**, a distributed ledger that records all transactions in a transparent and tamper-proof manner.
- Every transaction is verified by network participants known as **miners**, who solve complex mathematical problems to add blocks to the chain.
- This process is called **mining**, and miners are rewarded with newly generated bitcoins for their work.
- Bitcoin uses the **Proof of Work (PoW)** consensus algorithm, which ensures network security by making it computationally expensive to manipulate transactions.
- Each transaction is digitally signed and verified through cryptographic techniques, ensuring integrity and preventing **double-spending**.
- Bitcoin's total supply is **limited to 21 million coins**, which creates scarcity and helps maintain its value over time.
- It can be stored in **digital wallets** and used for trading, online purchases, or as an investment asset.

Bitcoin thus represents the foundation of all modern cryptocurrencies and has inspired the development of thousands of blockchain-based financial and technological systems worldwide.

b) Describe Token in detail with example. [6]

A **token** is a **digital representation of value or utility** built on an existing blockchain network such as Ethereum, Binance Smart Chain, or Solana. Unlike standalone cryptocurrencies, tokens rely on the infrastructure of another blockchain for their creation and operation.

- Tokens are created using **smart contracts**, which define their functions, supply, and ownership rules.
- They follow specific technical standards such as **ERC-20** (for fungible tokens) or **ERC-721** (for non-fungible tokens, NFTs).
- Tokens can represent multiple assets — including **utility, security, governance rights**, or even **real-world assets** like real estate or company shares.
- **Utility Tokens** provide access to a specific service or platform (e.g., Binance Coin for transaction fee discounts).
- **Security Tokens** represent investment contracts, offering dividends or profit shares under regulatory compliance.
- **Governance Tokens** allow holders to vote on project decisions in decentralized organizations (DAOs).
- Tokens are traded and stored in **crypto wallets** such as MetaMask or Trust Wallet.
- **Example:** Basic Attention Token (BAT) — used within the Brave browser to reward users and advertisers, demonstrating a real-world utility use case.

In summary, tokens expand blockchain functionality beyond payments by enabling decentralized applications, digital ownership, and new economic models within blockchain ecosystems.

c) Define types of cryptocurrencies. [5]

Cryptocurrencies are **digital or virtual currencies** that use cryptography for secure transactions and operate on decentralized networks like blockchain.

They can be classified into different types based on their purpose and function.

Types:

- **Coins:** Have their own blockchain (e.g., Bitcoin, Ethereum). Used mainly as digital money or value storage.
- **Tokens:** Built on existing blockchains (e.g., Uniswap on Ethereum) and used for specific purposes like utility or governance.
- **Stablecoins:** Pegged to real-world assets (e.g., USD Coin, Tether) to reduce volatility.
- **Central Bank Digital Currencies (CBDCs):** Government-issued digital versions of national currency.
- **Privacy Coins:** Focus on anonymous transactions (e.g., Monero, Zcash).

Thus, cryptocurrencies exist in various forms, each designed for different use cases—from payment systems to digital assets and decentralized applications.

Q4) a) Differentiate between Coinbase and Binance. [6]

Points of Comparison	Coinbase	Binance
1. Origin and Launch	Founded in 2012 in the USA, one of the oldest and most regulated crypto exchanges.	Founded in 2017 in China (now based in Malta), known for global operations and rapid growth.
2. User Interface	Very beginner-friendly with a simple design for new users.	More advanced interface , suitable for professional and experienced traders.
3. Supported Cryptocurrencies	Supports around 250+ cryptocurrencies , focusing mainly on popular and stable coins.	Supports over 600+ cryptocurrencies , including many new and emerging tokens.
4. Transaction Fees	Slightly higher trading fees (around 1% per trade) due to easy usability and regulation.	Lower trading fees (as low as 0.1%) and discounts when using BNB token for payments.
5. Regulation and Compliance	Fully regulated in the United States ; follows strict KYC and AML policies.	Operates in multiple countries with flexible regulations; some services restricted in the US.
6. Security Features	Uses insurance protection , cold storage, and 2FA for strong account security.	Offers SAFU (Secure Asset Fund for Users) , 2FA, and withdrawal whitelisting for protection.
7. Staking and Earning Options	Provides Coinbase Earn and staking on select cryptocurrencies.	Offers Binance Earn, Launchpad , and Futures trading for higher returns.
8. Mobile Application	Simple and user-friendly app for both beginners and casual investors.	Feature-rich mobile app with charts, margin trading, and professional tools.

b) Explain in detail crypto wallets. [6]

A **crypto wallet** is a **digital tool used to store, send, and receive cryptocurrencies** securely. It holds the private and public keys that give users access to their digital assets on the blockchain.

- Each wallet contains a **public key** (like an address to receive funds) and a **private key** (used to authorize transactions).
- Wallets do not actually store coins but store the **cryptographic keys** that grant access to blockchain records.
- They are divided into two main categories: **Hot Wallets** and **Cold Wallets**.
- **Hot Wallets** are connected to the internet (e.g., MetaMask, Trust Wallet, Coinbase Wallet) and offer convenience for quick transactions.
- **Cold Wallets** are offline devices (e.g., Ledger Nano, Trezor) that provide maximum security against hacking.
- Wallets also differ as **custodial** (controlled by exchange, like Binance Wallet) and **non-custodial** (controlled by the user directly).
- They support multiple cryptocurrencies and can integrate with decentralized applications (DApps) for trading or staking.

Crypto wallets ensure security, ownership, and easy management of digital assets, making them an essential part of any blockchain ecosystem.

c) Write a note on Coinbase. [5]

Coinbase is a **U.S.-based cryptocurrency exchange and wallet service** founded in 2012 by Brian Armstrong and Fred Ehrsam. It allows users to buy, sell, and store various digital currencies easily and securely.

- Coinbase supports major cryptocurrencies like Bitcoin, Ethereum, and Litecoin.
- It offers both a **trading platform (Coinbase Exchange)** and a **wallet application (Coinbase Wallet)**.
- The platform is highly **regulated and user-friendly**, making it ideal for beginners in crypto trading.
- It provides **secure storage** with most funds kept in offline cold storage to prevent hacks.
- Users can also earn rewards through programs like **staking** and **Coinbase Earn**.

Coinbase has become one of the most trusted and widely used cryptocurrency platforms globally, known for its simplicity, security, and compliance with financial regulations.

➤ MAY / JUN 2024**Q3) a) What is MetaMask? Illustrate in detail. [9]**

MetaMask is a **cryptocurrency wallet and gateway to blockchain applications**, mainly built for the Ethereum network. It allows users to store, send, and receive Ether (ETH) and other ERC-20 or ERC-721 tokens, while also connecting to decentralized applications (DApps) directly from a web browser or mobile app.

- MetaMask acts as both a **wallet and a browser extension**, available for Chrome, Firefox, and mobile platforms.

- It generates and manages **private and public keys** for the user, ensuring full control over digital assets.
- Users can connect to multiple **Ethereum networks** like Mainnet, Goerli, or even custom testnets.
- It supports **interaction with DApps**, DeFi platforms, and NFT marketplaces like OpenSea.
- MetaMask ensures **data privacy**, as all wallet keys are stored locally on the user's device, not on company servers.
- It offers the ability to **swap tokens directly** inside the wallet using decentralized exchanges (DEXs).
- Security features include password protection, seed phrase backup, and optional hardware wallet integration.
- Developers can also connect MetaMask to smart contracts for blockchain testing and deployment.
- It allows **importing of existing wallets** using private keys or seed phrases for easier migration.
- MetaMask now supports **multiple blockchains and Layer 2 networks**, expanding its usability beyond Ethereum.

MetaMask bridges users to the decentralized web (Web 3.0) by providing a simple and secure way to interact with Ethereum-based blockchain services.

b) List and explain types of cryptocurrencies. [8]

Cryptocurrencies are **digital or virtual currencies that use cryptography for secure transactions** and work on decentralized blockchain networks. They can be categorized based on their structure, purpose, and function.

Types:

- **1. Coins:** Have their own blockchain (e.g., Bitcoin, Ethereum, Litecoin). Used mainly for payments and value storage.
- **2. Tokens:** Built on existing blockchains (e.g., Uniswap, Chainlink). Used for utilities, governance, or representing assets.
- **3. Stablecoins:** Pegged to real-world assets like USD or gold to maintain price stability (e.g., Tether (USDT), USDC).
- **4. Central Bank Digital Currencies (CBDCs):** Issued by governments as official digital currencies (e.g., Digital Yuan, e-Rupee).
- **5. Privacy Coins:** Focus on secure and anonymous transactions (e.g., Monero, Zcash).
- **6. Governance Tokens:** Provide voting rights in decentralized organizations (e.g., MakerDAO, Uniswap UNI).
- **7. Utility Tokens:** Offer access to specific blockchain-based products or services (e.g., BNB, BAT).
- **8. Meme Coins:** Originated from internet trends or jokes but gained popularity (e.g., Dogecoin, Shiba Inu).
- **9. Security Tokens:** Represent ownership in assets or companies and are regulated under securities law.

Each type of cryptocurrency serves a distinct role in the blockchain ecosystem — from payments and trading to governance and decentralized finance applications.

Q4) a) Compare and Contrast Coinbase and Binance. [8]

Points of Comparison	Coinbase	Binance
1. Origin and Launch	Founded in 2012 in the USA, one of the oldest and most regulated crypto exchanges.	Founded in 2017 in China (now based in Malta), known for global operations and rapid growth.
2. User Interface	Very beginner-friendly with a simple design for new users.	More advanced interface , suitable for professional and experienced traders.
3. Supported Cryptocurrencies	Supports around 250+ cryptocurrencies , focusing mainly on popular and stable coins.	Supports over 600+ cryptocurrencies , including many new and emerging tokens.
4. Transaction Fees	Slightly higher trading fees (around 1% per trade) due to easy usability and regulation.	Lower trading fees (as low as 0.1%) and discounts when using BNB token for payments.
5. Regulation and Compliance	Fully regulated in the United States ; follows strict KYC and AML policies.	Operates in multiple countries with flexible regulations; some services restricted in the US.
6. Security Features	Uses insurance protection , cold storage, and 2FA for strong account security.	Offers SAFU (Secure Asset Fund for Users) , 2FA, and withdrawal whitelisting for protection.
7. Staking and Earning Options	Provides Coinbase Earn and staking on select cryptocurrencies.	Offers Binance Earn, Launchpad , and Futures trading for higher returns.
8. Mobile Application	Simple and user-friendly app for both beginners and casual investors.	Feature-rich mobile app with charts, margin trading, and professional tools.

b) Differentiate between MetaMask and Coinbase Wallet. [9]

Points of Comparison	MetaMask	Coinbase Wallet
1. Developer / Origin	Developed by Consensys in 2016 to support Ethereum-based applications.	Developed by Coinbase Inc. , one of the largest U.S.-based crypto exchanges.
2. Type of Wallet	A non-custodial wallet , meaning users have full control of their private keys.	Also a non-custodial wallet , separate from Coinbase Exchange but backed by Coinbase.
3. Supported Networks	Primarily supports Ethereum and EVM-compatible blockchains like	Supports multiple blockchains , including Bitcoin, Ethereum, Litecoin,

	Polygon, BSC, and Avalanche.	Dogecoin, and others.
4. Browser and App Support	Available as a browser extension and mobile app for Android and iOS.	Works mainly as a mobile application , with optional browser extension.
5. User Interface	Simple and intuitive, designed mainly for DApp and DeFi interaction.	User-friendly, integrated more for crypto trading and NFT management .
6. DApp Connectivity	Directly connects to decentralized applications (DApps) and Web3 platforms.	Can connect to DApps, but focuses more on integration with Coinbase ecosystem .
7. Security and Keys	Private keys are stored locally on the device and encrypted with a password.	Uses encrypted private keys with backup options through iCloud or Google Drive.
8. NFT Support	Allows users to store, view, and trade NFTs built on Ethereum and Polygon.	Also supports NFT storage and marketplace access , integrated within the wallet.
9. Integration with Exchanges	Does not have direct exchange integration ; users need external DEX (like Uniswap).	Can be easily linked with Coinbase Exchange for direct buying/selling.
10. Ideal For	Developers and advanced users exploring DApps, smart contracts, and DeFi projects.	General users who want a secure wallet connected to an exchange for easy crypto use.

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Q3) a) Enlist and discuss types of cryptocurrency “Is cryptocurrency is safe”. Justify according to your opinion. [9]

Cryptocurrency is a form of digital or virtual currency that uses cryptography to secure transactions, control the creation of new units, and verify the transfer of assets. These currencies operate on blockchain technology, eliminating the need for a central authority like banks.

Types of Cryptocurrencies:

- **Bitcoin (BTC):** The first and most popular cryptocurrency, introduced by *Satoshi Nakamoto* in 2009. It works on a public blockchain and is mainly used as a digital store of value and payment method.
- **Altcoins:** Any cryptocurrency other than Bitcoin, such as *Litecoin*, *Ripple (XRP)*, and *Ethereum*. They improve transaction speed, scalability, or functionality compared to Bitcoin.
- **Stablecoins:** Cryptos backed by stable assets like the *U.S. Dollar* or *Gold* (e.g., *USDT*, *USDC*). They reduce volatility and are widely used in trading and remittances.
- **Utility Tokens:** Used within specific platforms for accessing services or products — e.g., *BNB* (Binance Coin) or *BAT* (Basic Attention Token).

- **Security Tokens:** Represent ownership of an asset or company and are regulated by government securities laws.
- **NFTs (Non-Fungible Tokens):** Unique digital assets representing art, collectibles, or game items, stored on blockchains like Ethereum.

Is Cryptocurrency Safe?

Cryptocurrencies are secure in design because of blockchain's cryptographic validation, decentralization, and immutability. However, safety also depends on how users store and use their assets.

Justification:

- Blockchain makes transactions tamper-proof and traceable.
- But risks such as exchange hacks, phishing attacks, or losing private keys can cause losses.
- Regulatory uncertainty in some countries can also affect safety and adoption.
- Using hardware wallets, strong passwords, and trusted exchanges enhances protection.

Hence, cryptocurrencies are technologically secure but not entirely risk-free; user awareness and responsible handling are crucial for safety.

b) Describe ZeroCoin and its successor ZeroCash in detail. [8]

ZeroCoin and ZeroCash are privacy-enhancing cryptocurrencies developed to overcome the lack of anonymity in traditional blockchain systems like Bitcoin, where all transactions are publicly visible.

ZeroCoin:

- Introduced as an extension of Bitcoin to add transaction anonymity.
- Uses a mint-and-spend mechanism — users convert their Bitcoins into ZeroCoins (mint) and later spend them without linking to the original address.
- Employs zero-knowledge proofs (ZKP) to verify transactions without revealing sender, receiver, or amount.
- However, it required integration with Bitcoin, leading to performance and scalability issues.

ZeroCash (Zcash):

- Developed as a stand-alone cryptocurrency derived from the ZeroCoin concept.
- Uses zk-SNARKs (Zero-Knowledge Succinct Non-Interactive Argument of Knowledge) for advanced privacy.
- Enables fully anonymous transactions where sender, receiver, and value remain hidden yet verifiable.
- Provides users the option of transparent or shielded transactions for flexibility.
- Faster, more efficient, and more private than ZeroCoin due to optimized cryptographic design.

In summary, ZeroCoin laid the foundation for blockchain privacy, while ZeroCash (Zcash) refined and implemented it, achieving greater anonymity, efficiency, and real-world adoption in the cryptocurrency ecosystem.

Q4) a) Compare Custodial and Non-Custodial Crypto Wallets [9]

Points of Comparison	Custodial Wallet	Non-Custodial Wallet
1. Ownership of Private Keys	Private keys are controlled by a third party (exchange or service provider).	User has complete control over private keys and funds.
2. Security Responsibility	Security is managed by the wallet provider ; users rely on the service's protection.	User is fully responsible for their wallet's safety and private key storage.
3. Recovery Options	Easier recovery via email, password, or KYC verification .	If private key or recovery phrase is lost, funds cannot be recovered .
4. Ease of Use	User-friendly and suitable for beginners; resembles online banking.	Slightly complex setup requiring technical knowledge and responsibility.
5. Accessibility	Can be accessed anytime through exchange platforms (e.g., Coinbase, Binance).	Can be accessed via wallet apps or browser extensions (e.g., MetaMask, Trust Wallet).
6. Transaction Speed	Transactions may be slower as they are verified by the service provider.	Direct blockchain interaction makes transactions faster.
7. Privacy	Less private , as user identity and data are stored by the custodian.	Highly private , no third party involved in transaction records.
8. Examples	Coinbase Wallet (exchange-based), Binance Wallet, PayPal Crypto Wallet.	MetaMask, Trust Wallet, Ledger Nano, Electrum.
9. Ideal For	Beginners who prefer ease and recovery options .	Experienced users who value control and privacy .

b) Define Hot Wallet Storage and Cold Wallet Storage. Discuss MetaMask and its importance along with its benefits and drawbacks. [9]**Hot Wallet Storage:**

Hot wallets are **cryptocurrency wallets connected to the internet** and are used for quick, frequent transactions. They allow easy access for sending or receiving crypto anytime through apps, browsers, or exchanges.

Examples include **MetaMask, Coinbase Wallet, and Trust Wallet**.

They are convenient but **more vulnerable to hacking or phishing attacks** due to their online nature.

Cold Wallet Storage:

Cold wallets are **offline wallets** used to securely store large amounts of cryptocurrency for long-term holding. They remain **disconnected from the internet**, making them much safer against cyber threats.

Examples include **hardware wallets** like *Ledger Nano* and *Trezor*.
Cold wallets are less convenient for daily use but **ideal for maximum security**.

MetaMask and Its Importance:

MetaMask is a **non-custodial hot wallet** developed by *Consensys* that connects users directly to **Ethereum and other EVM-compatible blockchains**. It helps manage cryptocurrencies, interact with **decentralized applications (DApps)**, and execute **smart contracts** directly from a browser or mobile app.

For example, users can easily participate in **DeFi platforms**, trade tokens, or buy NFTs through MetaMask without depending on a centralized exchange.

It plays a key role in promoting **Web3 adoption** and acts as a bridge between users and the decentralized blockchain ecosystem.

Benefits of MetaMask:

- Easy to install and use as a **browser extension** or mobile app.
- Supports **multiple networks** like Ethereum, Binance Smart Chain, and Polygon.
- Enables **direct access to DApps** and decentralized finance platforms.
- Offers **complete control over private keys** stored locally on the device.
- Regular updates and strong **community support** enhance reliability.

Drawbacks of MetaMask:

- Being a **hot wallet**, it is **vulnerable to phishing or malware attacks**.
- Transaction **gas fees can fluctuate** and may be high on certain networks.
- Limited support for **non-EVM blockchains** like Bitcoin or Solana.
- Loss of **seed phrase** means permanent loss of funds, as no recovery is possible.

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Q3) a) Discuss the concept of Cryptowallets? [6]

→ Done

b) Discuss types of cryptocurrency? [6]

→ Done

c) What is Metamask? [5]

→ Done

Q4) a) Compare Coinbase and Binanace [6]

→ Done

b) What is the relevance of Crypto Usage. Discuss with example [6]

The **relevance of crypto usage** lies in its ability to provide a **secure, transparent, and decentralized** form of digital money that operates without the control of banks or governments. Cryptocurrencies use **blockchain technology** to enable fast and low-cost global transactions, which is especially useful in today's digital economy.

Key Points:

- **Decentralization:** Cryptocurrencies remove the need for intermediaries, reducing costs and increasing efficiency.
- **Cross-border Transactions:** Users can send and receive payments **instantly across countries** without high fees.
- **Financial Inclusion:** Provides access to financial services for people without traditional bank accounts.
- **Transparency and Security:** Every transaction is recorded on a public blockchain, ensuring **traceability and trust**.
- **Investment and Trading:** Many users buy cryptocurrencies as **digital assets** for profit or portfolio diversification.

Example:

For instance, **Bitcoin** is widely used for peer-to-peer payments, while **Ethereum** supports smart contracts and decentralized applications (DApps) like lending platforms and NFT marketplaces.

In conclusion, the relevance of cryptocurrency lies in its **transformative role in global finance**, enabling **borderless payments, digital innovation, and economic empowerment** for users worldwide.

c) What is bitcoin? Explain in detail [5]

Bitcoin is the **first and most popular cryptocurrency**, introduced in **2009 by an unknown person or group named Satoshi Nakamoto**. It is a **decentralized digital currency** that allows people to send and receive payments directly without needing a bank or government authority.

Explanation:

- Bitcoin works on **blockchain technology**, where every transaction is recorded in a distributed public ledger, ensuring transparency and security.
- It uses a **Proof of Work (PoW)** mechanism for validating transactions, where miners solve complex mathematical problems to add new blocks to the chain.
- Bitcoin transactions are **peer-to-peer**, meaning they take place directly between users without intermediaries.
- The total supply of Bitcoin is **limited to 21 million**, which helps prevent inflation and increases its value over time.
- Users can store Bitcoin in **digital wallets**, either online (hot wallets) or offline (cold wallets), for safety and easy access.

Bitcoin represents a **revolutionary step in digital finance**, offering a **secure, borderless, and decentralized way of transferring value** globally.

➤ NOV / DEC 2024

Q3) a) Differentiate between Coinbase and Binance. [9]

→ Done

b) What is Metamask? Discuss any one application of Metamask [8]

MetaMask is a **cryptocurrency wallet and gateway to blockchain applications**, mainly designed for interacting with the **Ethereum blockchain**. It allows users to **store, send, and receive Ether (ETH)** and other ERC-20 tokens, as well as connect with **decentralized applications (DApps)** directly from their browser or mobile app.

Explanation:

- MetaMask works as a **browser extension** (for Chrome, Firefox, Brave, etc.) and a **mobile app**, giving users full control over their digital assets and private keys.
- It acts as a **bridge between users and the Ethereum network**, enabling secure management of blockchain-based identities and transactions.
- Users can **create and manage multiple wallets**, view transaction history, and easily switch between Ethereum's mainnet and test networks.
- The wallet uses **seed phrases and encryption** for enhanced security, ensuring that only the owner can access their funds.
- It supports **decentralized exchanges (DEXs)** and NFT marketplaces, making it a versatile tool for crypto traders and developers.

Application Example – Decentralized Finance (DeFi):

One common application of MetaMask is in **DeFi platforms like Uniswap**. Users can connect their MetaMask wallet to Uniswap to **swap tokens, provide liquidity, or earn rewards** — all without creating an account or sharing personal information.

Thus, MetaMask plays a vital role in simplifying access to **Web3 applications** and promoting a **secure, decentralized financial ecosystem** for users worldwide.

Q4) a) List and explain types of crypto wallet. [8]

→ Done

b) Write a note on Bitcoin. [9]

Bitcoin is the **first and most widely used cryptocurrency**, introduced in **2009** by an anonymous person or group known as **Satoshi Nakamoto**. It is a **decentralized digital currency** that enables **peer-to-peer transactions** without involving any central authority like banks or governments. Bitcoin operates on blockchain technology, which ensures transparency, immutability, and security of all transactions.

Explanation:

- Bitcoin uses **cryptographic algorithms** to verify and record transactions in a distributed ledger known as the **blockchain**.

- Every transaction is verified by network nodes through a process called **mining**, where miners solve complex mathematical problems to add new blocks to the blockchain.
- The **total supply of Bitcoin is limited to 21 million**, making it a **deflationary currency** and giving it value over time due to scarcity.
- Bitcoin transactions are **fast, borderless, and irreversible**, making it a global medium of exchange.
- It is stored in **digital wallets**, secured using private and public keys, ensuring only the owner can access their funds.
- Bitcoin can be used for **online payments, investment, and remittances**, and it is often referred to as “**digital gold**” due to its long-term value storage.
- It is traded on various **cryptocurrency exchanges** like Binance and Coinbase, and its value fluctuates based on market demand and investor sentiment.
- The system ensures **trustless transactions**, meaning users don’t need to rely on intermediaries to confirm or validate exchanges.

Overall, Bitcoin revolutionized the concept of money by introducing a **transparent, decentralized financial system**, and it continues to be the foundation for many modern cryptocurrencies and blockchain innovations.

Note: Please check and verify all answers once before referring.