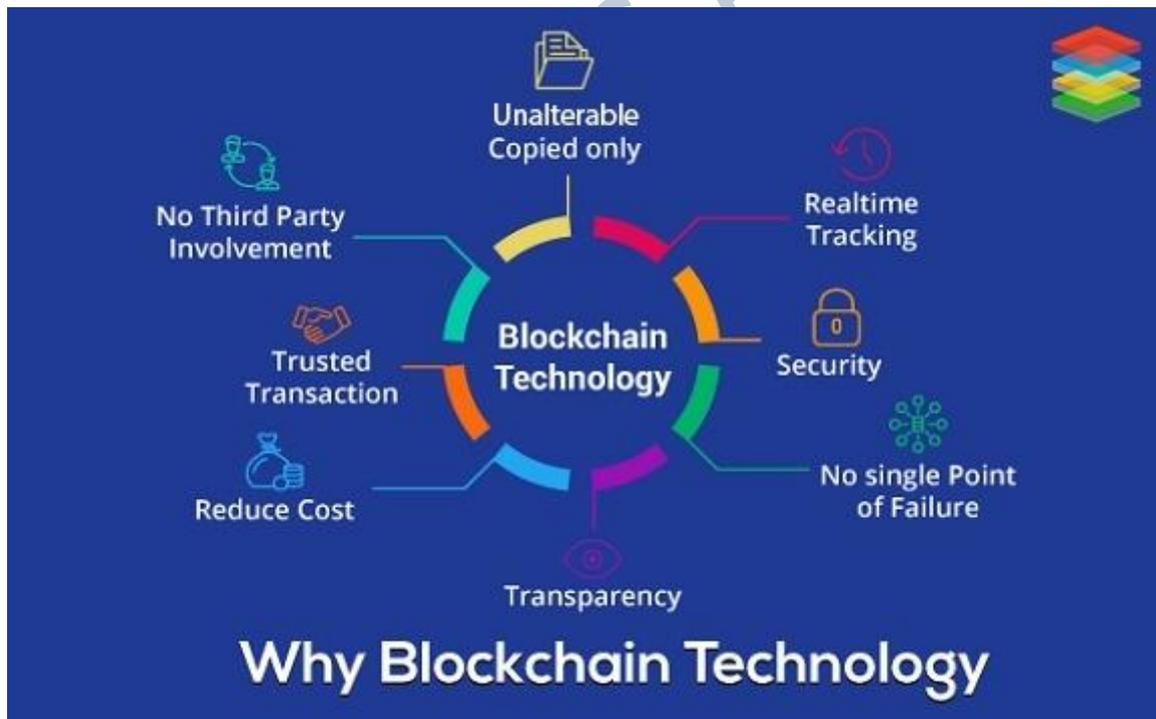# BLOCKCHAIN TECHNOLOGY

GS 3, MAINS: Science and Technology- developments and their applications and effects in everyday life Achievements of Indians in science & technology; indigenization of technology and developing new technology, Awareness in the fields of IT, Space, Computers, robotics, nano-technology, bio-technology and issues relating to intellectual property rights.

IN NEWS: While many countries are embracing the blockchain phenomenon, India is yet to finalise its stand on this technology. Although there is a stern stand against cryptocurrencies by the Indian government, the same cannot be said for blockchain technology itself. Industries, along with both the central and state governments are striving to set off a unique trend in the path of digital transactions as well as in the online space.

- Blockchain is a revolutionary technology that will enhance cybersecurity and change the way businesses make transactions.


- First introduced in 2008 as the mechanism behind the crypto-currency Bitcoin, blockchain is now recognized as the most influential technology for the future of business. More specifically, for the infrastructure of future business transactions.

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1

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- The safety of adopting blockchain technology for businesses lies in the fact that it is a distributed, rather than centralized network. For hackers, this means that in order to break into a data source, they would need to break into all of the computers in the distributed network at the same time.
- Current systems of banking are vulnerable to fraud. With blockchain technology, a middle man such as a bank is not necessary.

WHAT IS BLOCKCHAIN TECHNOLOGY?

- A Microsoft Excel Sheet file in your computer or laptop with the details of some of your transactions is known as a ledger. If your Excel file is copied to hundreds of your friend's computers and connected to each other forming a network, this is known as distributed ledger.
- Imagine a technology to update this Excel sheet whenever you or your friends update a ledger. Blockchain is nothing but a digital ledger, that is a book containing accounts to which debits and credits are posted from books of original entry.

- A blockchain is an anonymous online ledger that uses a data structure to simplify the way we transact. Without the help of third party blockchain allows users to manipulate the ledger in a secure way.
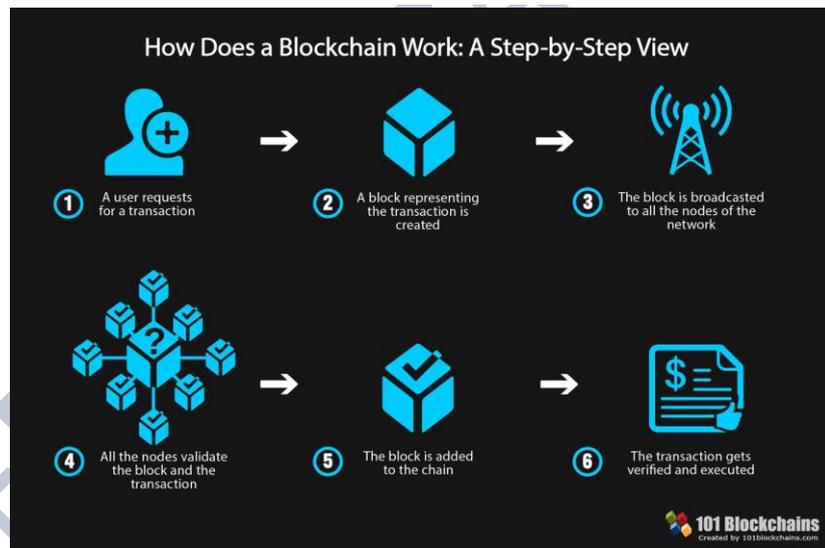
ADVANTAGES OF BLOCKCHAIN TECHNOLOGY

- It will allow smart devices to speak to each other better and faster.
- Blockchain mechanism brings everyone to the highest degree of accountability. Therefore, solves the problem of manipulation.
- We can own the data that belongs to us, that is, an online identity and reputation will be decentralised.

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2

- It protects the identities of the users. This way blockchain is a more secure way to carry out transactions. Each list of records in a blockchain is called a block. The various growing list of records, i.e. blocks are linked and secured.
- It will allow middleman-free way to exchange asset and the removal of intermediaries that are involved in record keeping and transfer of assets.
- It provides durability, reliability, and longevity with decentralised network.
- The data that are entered in blockchain based systems are immutable which prevent against fraud through manipulating transactions and the history of data. Therefore, all the transactions can be investigated and audited easily.

CHALLENGES TO BLOCKCHAIN TECHNOLOGY

- The virtual currencies that are based on blockchain technology are highly subjected to extreme volatility. One good example for that is the fluctuating prices of Bitcoin that vary from day to day. One of the reasons behind that extreme volatility is that both the decentralized blockchain technology and the virtual currencies are extremely new to the market; which means that the companies, investors, governments, and other groups adopting or not adopting them will greatly affect the volatility.
- Because of the anonymity that exists in decentralized blockchain and virtual currencies which rely on them, they have become a second home for all illicit transactions. One good instance for that is "Silk Road," a digital black market. People utilized this platform to purchase things like illicit transactions using blockchain-based virtual currencies.
- To verify all the transactions, huge power, i.e. electricity is required.
- There should be security about the private key. Every time private key must remain secret because revealing it to third parties is equivalent to giving them control over the bitcoins secured by that key. Also, it is necessary to have a back up of the private key so that it can be protected from accidental loss.
- Blocks in a chain must be verified by the distributed network and it can take time. So, transaction speed can be an issue.

(Q) Examine how the blockchain technology can help further the aim of digitisation in India.

PREVIOUS YEARS MAINS QUESTIONS:
- Discuss the potential threats of Cyber attack and the security framework to prevent it. (2017)
- Why is nanotechnology one of the key technologies of the 21st century? Describe the salient features of Indian Government's Mission on Nanoscience and Technology and the scope of its application in the development process of the country. (2016)

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3

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- Discuss the advantage and security implication of cloud hosting of servers vis-a-vis in-house machine based hosting for government business. (2015)
- What is a digital signature? What does its authentication mean? Give various salient built-in features of a digital signature. (2013)
- Cyber warfare is considered by some defense analysts to be a larger threat than even Al Qaeda or terrorism. What do you understand by Cyber warfare? Outline the cyber threats which India is vulnerable to and bring out the state of the country's preparedness to deal with the same. (2013)

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4