UPSC Preparation

What is 4G?

The Fourth Generation (4G) of broadband cellular network technology is based on the capabilities defined by the ITU(International Telecommunication Union) in IMT Advanced (International Mobile Telecommunications Advanced) which supersede the 3G. It is popularly referred to as **MAGIC**, which is the acronym for **"Mobile multimedia, Any-where, Global mobility solutions over, Integrated wireless and Customized services."** According to the ITU, a 4G network requires a mobile device to be able to exchange data at 100 Mbps for high mobility communication and 1 Gbps for low mobility communication. Potential and current applications include amended mobile web access, IP telephony, gaming services, high-definition mobile TV, video conferencing, 3D television.

4G is much faster than 3G, and this has revolutionised the field of telecommunication by bringing the wireless experience to a new level altogether. 4G systems support interactive multimedia, voice, video, wireless internet and other broadband services. Technologically, 4G is very different compared to 3G.

When was 4G introduced?

- The fourth generation of mobile technology was introduced in **2010** in order to meet out the need for faster speed and better connectivity.
- Airtel was the first company to have launched 4G services using TD-LTE technology in Kolkata in 2012. It was followed by the launch of 4G in Bangalore, Pune, Chandigarh, Mohali and Panchkula.
- Later, 4G services in India was launched by Aircel, Vodafone and RJIO.

What are the features of 4g?

The features of 4G are :

- Better download speed
- Extremely high voice quality.
- Easy access to Internet, IM, social networks, streaming media, video calling.
- Higher bandwidth.

- Much faster than 3G

What are the different Network Standards of 4G?

There are multiple 4G mobile technology standards used by different cellular providers that conform to 4G requirements, namely,

1. LTE (pre - 4G),
2. LTE-Advanced,
3. WiMAX, and
4. Ultra Mobile Broadband (UMB).

Note - LTE stands for Long Term Evolution (LTE).

How are mobile communication technologies classified?

Based on the architecture of the mobile network, mobile communication technologies are classified into different generations identified as 1G, 2G, 3G, 4G, and 5G. The architecture of the mobile network has rapidly evolved over the last few decades.

- **The First Generation or 1G**
  - The first generation (1G) mobile network system came around **1982**.
  - It was used to transmit only voice calls.
  - The analog signals were used to carry voices between the caller and receiver.
- **The Second Generation or 2G**
  - The second generation (2G) mobile network system came around **1991**.
  - Instead of analog signals, voice calls were transmitted in digital form, thus providing improved call quality.
  - This increased capacity allowed more people to talk simultaneously and led to improved security as the signals could be encrypted. It also enabled an additional service to send SMS and MMS (Multimedia messages).
- **The Third Generation or 3G**
  - The third generation (3G) mobile network technology was developed during the late 90s, but it was introduced commercially around 2001.
  - It offered both digital voice and data services.

- 3G provided Internet access via the same radio towers that provide voice service to the mobile phone.
- It facilitated greater voice and data capacity.
- Therefore, more simultaneous calls could happen in the same frequency range and also a significantly faster data transfer speed.

What is the difference between 4g and 5g?

The major differences between the 4G and 5G networks are listed below:

1. 5G network provides enhanced network coverage compared to the 4G.
2. Data bandwidth of 5g is above 1gbps, whereas for 4G it lies between 2mbps to 1gbps.
3. The latency of the 5G network is smaller compared to 4G.

What are the advantages of the 5g network?

- 5G network will allow faster uploading and downloading.
- The high data speed of the 5G Network would work in favour of cloud systems to enhance software updates, music, and navigation.
- The Fifth Generation or 5G is expected to be a milestone development for the success of IoT and Machine to Machine (M2M)
  communications. Machine to machine (M2M) is direct communication between devices — wired and wireless.
- 5G is expected to allow data transfer in Gbps, which is much faster than 4G. It is expected to be able to support
  all the devices of the future, such as connected vehicles and the Internet of Things.