5G :-

1G Each generation of wireless broadband is defined as a set of telephone network standard (Analog Comm) that describes the technological implementation of the system. (only voice possible)

2G It is based on GSM (Global system for Mobile Communication).
In this 2G, the radio signal used were digital.
The capabilities of the 2G achieved by allowing multiple users on a single channel via multiplexing.
In 2G, the data along with voice is possible.

3G ~~Features of 2G~~

1. It uses the standard Universal Mobile Telecommunication System (UMTS).
2. In 3G, packet switching to allow speeds up to 14 mbps.
3. It uses wideband wireless network to increase clarity.
4. It operates at 2100 MHz & Bandwidth 15-20 MHz.

Features for 2G :-

1. Data speed upto 64Kbps
2. Enabled service such as SMS & MMS
3. Use of digital signal.
4. Provided better quality voice calls
5. It uses a bandwidth of 30 to 200 KHz.

Features of 3G :-

1. Speed up to 2Mbps.
2. Increased bandwidth & data transfer
3. Send / receive large email message
4. Large capacities and broadband capabilities.

* International Mobile Telecommunications - 2000 (IMT-2000) were the specifications by the international telecommunication union for the 3G network, theoritically 21.6 Mbps is the maximum speed of HSPA+

Full form of HSPS.

coverage of 5G.

4G * Key technologies used in 4G are MIMO, OFDM.

⇒ Multiple Input Multiple Output (MIMO).

⇒ Orthogonal Frequency Division Modulation (OFDM).

* Standard → Wimax and LTE.
(Long Term Evaluation)

* 4G LTE is a major improvement over 3G speeds but it is technically not 4G.

Diff^n btw 4G & LTE :-

① ~~Even~~ after it was widely available, many networks were not upto the required speed of 4G. 4G LTE a "4th generation long term evaluation", capable of delivering very fast and secure internet connection.

② 4G LTE is the term given to the path which has to be followed to achieve these predefined standards.

Features of 4G :-

(1) Supports interactive multimedia such as voice, video.

(2) High speed, high capacity and low cost per bit
(Speeds upto 20 mbps or more)

(3) Global and scalable mobile networks.

(4) Adhoc and Multi-hop networks.

5G

* Operates on rarely used radio millimeter band in the 30 GHz to 300 GHz range.

* Testing of 5G range in mm wave has produced result approx 500 meter from the tower.

* Using small cells, the deployment of 5G with mm wave band carries can improve overall coverage area.

* Combined with beam forming small cells can deliver extremely fast coverage with low latency.

* Low latency is one of the 5G's most important features. (Processing time).

* 5G uses OFDM (Orthogonal Frequency Division Multiplexing) network.

* latency of 5G is as low as 1 ms with realistic estimates to be around 1-10 seconds.

* Active antenna 5G encapsulated with 5G massive MIMO is used for providing better connection.

* Big 5G arrays antenna are deployed to gain additional beam forming information and knockout propagation challenges that are experienced at millimeter wave frequency range

* 5G networks clubbed with network slicing architecture which enable telecom operators to offer on demand tailored connectivity to their user that is adhered to service level aggrement (SLA).

* Low Band - Sub 6GHz. (In India)

5G continuation:

* Such customized network capabilities compromize latency, data speed, quality and service of security.

→ Comparision of 2G, 3G, 4G & 5G.

Comparision	2G	3G	4G	5G
Introduction Year.	1991	2001	2009	2019
Access System	TDMA, CDMA	CDMA	CDMA	OFDM, BDMA
Technology used	GSM (Global system for mobile communication) (GSM)	WCDMA (Wideband code Division Multiple Access)	LTE, WiMax (Long term Evolution)	MIMO, mmWAV
Switching Type	Circuit Switching for voice (PS) Packet Switching for data	PS except for air interference	PS	PS
Internet Service	Narrowband	Broadband	Ultra Broad Band	Wireless worldwi web
Bandwidth	25MHz.	25MHz.	100 MHz	30GHz to 300GHz.

Spectrum - Band of frequency

Advantages	Multimedia features, (SMS, MMS) internet access and sim introduced	High security, and international roaming.	High speed handoffs, global mobility.	Extremely high speed, low latency.
Application	Voice call, Short message	Video conferencing, mobile TV, GPS (Global Positioning System)	High speed applications, mobile TV, wearable device. (Smart watches)	High resolution video streaming, remote control of vehicle, robots & medical procedures, etc.

6G trial - China.
7G trial - No country really.

How 5G better than 4G?

1. Lower latency
2. Higher speed.
3. 5G is unified platform.
4. 5G uses spectrum better than 4G.
5. 5G has more capacity than 4G.