

# COMPUTER NETWORK

## ASSIGNMENT - I

(2)

G. Nasir

Sub. NODE: CGI

Name : D.Th

Reg No : 192

Subject : COM

NE

## ASSIGNMENT - I

1) 5G integration in modern communication scenarios;

A smart city is rolling out 5G enhanced public services.

List the communications improvements by 5G?

Faster data speeds;

5G offers significantly higher data speeds, potentially up to 100x faster than 4G.

Lower Latency;

5G drastically reduces latency, enabling real-time communication to support increased capacity;

5G networks can handle a massive number of connecting devices, supporting various internet applications.

## ASSIGNMENT - I

1) 5G Integration in modern communication scenario;

A smart city is rolling out 5G enhanced public services.

1) List the communications improvements by 5G?

Faster Data speeds;

5G offers significantly higher data speeds, potentially up to 100x faster than 4G.

Lower Latency;

5G drastically reduces latency, enabling real time communication to sensors & increased capacity;

5G networks can handle a massive of connecting devices, support and manage internet applications.

a) compare 5G with previous wireless generations.

\* Speed and throughput;

i) 5G; peak download speed can reach up to 20 Gbps, higher than 4G.

ii) 4G; offers speeds up to 100 Mbps, with peak speeds of around 1 Gbps.

iii) 3G; speeds were typically in the range of a Mbps.

iv) 2G; offered very basic data speeds, text.

v) 1G; Analog technology with very limited data capacity.

\* Latency;

i) 5G; significantly lower latency (the delay before an instruction) generations relity.

ii) 4G; latency is higher than 5G, impacting applications.

iii) 3G & 2G; Higher latency than both 4G and 5G, making applications.

a) compare 5G with previous wireless generations.

\* speed and throughput;

i) 5G; Peak download speed can reach up to 20 Gbps, higher than 4G.

ii) 4G; offers speeds up to 100 Mbps, with peak speeds of around 1 Gbps.

iii) 3G; speeds were typically in the range of a Mbps.

iv) 2G; offered very basic data speeds, text.

v) 1G; Analog technology with very limited data capacity.

\* Latency;

i) 5G; significantly lower latency (the delay before an instruction) generates reality.

ii) 4G; latency is higher than 5G, impacting applications.

iii) 3G & 2G; Higher latency than both 4G and 5G, impacting applications.

discuss how 5G support ultra-reliable low latency communications (URLLC)

- \* Enhanced physical downlink control channel (ePDCCH) : This allow for more reliable and efficient control signal.
- \* short Transmission Time Interval (TTI) : A shorter TTI means that data packets can be transmit and processed more quickly.
- \* Adaptive Beamforming ; This technology focuses the radio signal directly on the receiving devices.
  - i) Impact of URLLC :
- \* Autonomous Vehicles ;  
URLLC enables the low latency and high reliability needed for vehicles to communicate with each other and infrastructure.
- \* Remote Healthcare ;  
URLLC enables remote surgeries, real-time monitoring of patient, and other critical to health applications consequences.

discuss how 5G support ultra-reliable low latency communications (URLLC)

- \* Enhanced physical downlink control channel (ePDCCH) : This allow for more reliable and efficient control signal.
- \* Short Transmission Time Interval (TTI) : A shorter TTI means that data packets can be transmit and processed more quickly.
- \* Adaptive Beamforming ; This technology focuses the radio signal directly on the receiving devices.
  - i) Impact of URLLC :
- \* Autonomous Vehicles ;  
URLLC enables the low latency and high reliability needed for vehicles to communicate with each other and infrastructure.
- \* Remote Healthcare ;  
URLLC enables remote surgeries, real-time monitoring of patient, and other critical to health applications consequences.

suggest use cases for 5G in healthcare, education, and governance.

### i) Healthcare Education:

- \* Remote Surgery Simulation: 5G's low latency and high bandwidth enable surgeons to train remotely using haptic procedures.
- \* AR/VR Training: Augmented and virtual reality applications, powered by 5G, can provide immersive training environment.
- \* Dispersed Learning: 5G can allow student in rural areas to access high-quality education content and participate.

### ii) Healthcare Governance:

- \* Efficient Data Management: 5G can facilitate wearable sensors and centralized access to patient.
- \* Connected Ambulances: 5G can enable real time data transmissions from ambulances to hospitals, allowing doctors to treat.

→ suggest use cases for 5G in healthcare, education, and governance.

i) Healthcare Education :

\* Remote Surgery Simulation : 5G's low latency and high bandwidth enable surgeons to train remotely using haptic procedures.

\* AR/VR Training : Augmented and virtual reality applications, powered by 5G, can provide immersive training environment.

\* Dispersed Learning : 5G can allow students in rural areas to access high-quality education content and participate.

ii) Healthcare Governance :

\* Efficient Data Management : 5G can facilitate wearable sensors and centralized access to patient.

\* Connected Ambulances : 5G can enable real time data transmissions from ambulances to hospitals, allowing doctors to route.