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 COURSE CODE: EEE512
 COURSE TITLE: DIGITAL COMMUNICATION

ASSIGNMENT

QUESTION 1i

With the aid of a well labelled architectural diagram, provide detailed explain on the working principle of 3g, 4g and 5g networks.

SOLUTION

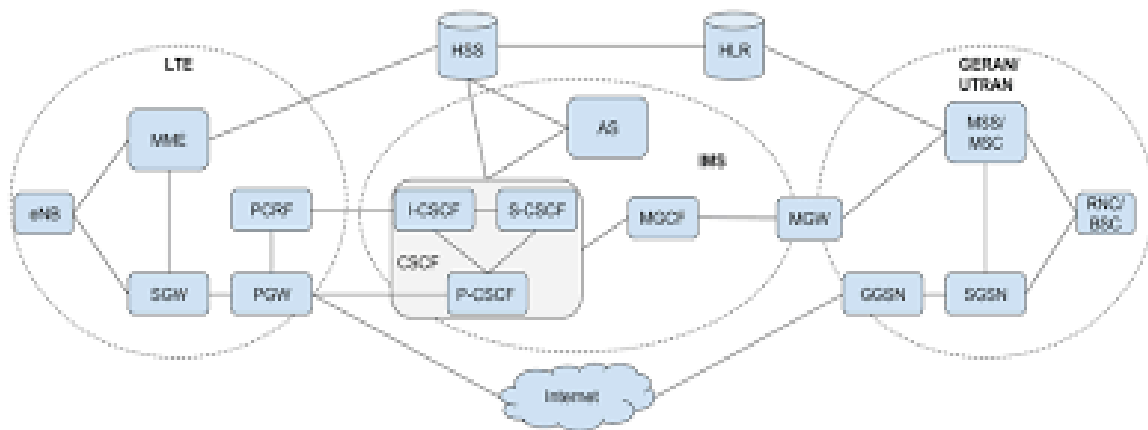


Figure: Architectural diagram of 3g Network

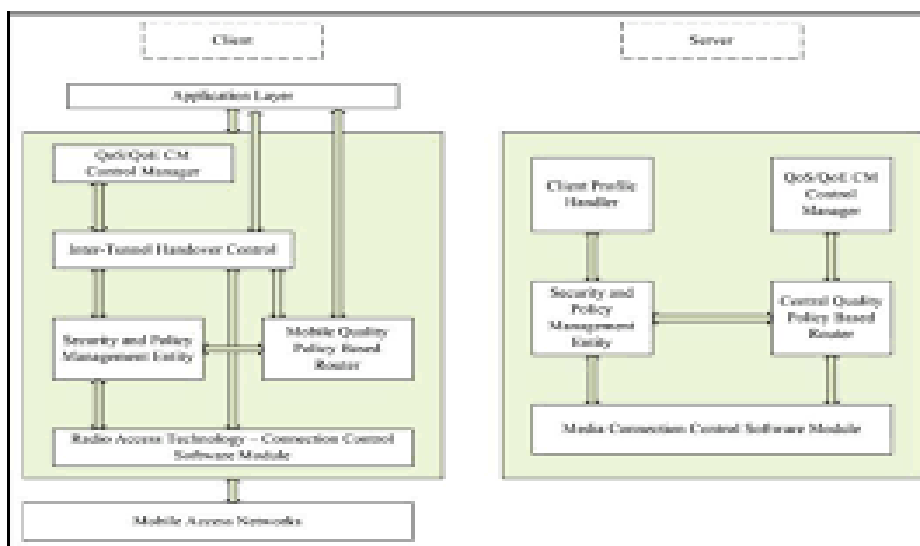
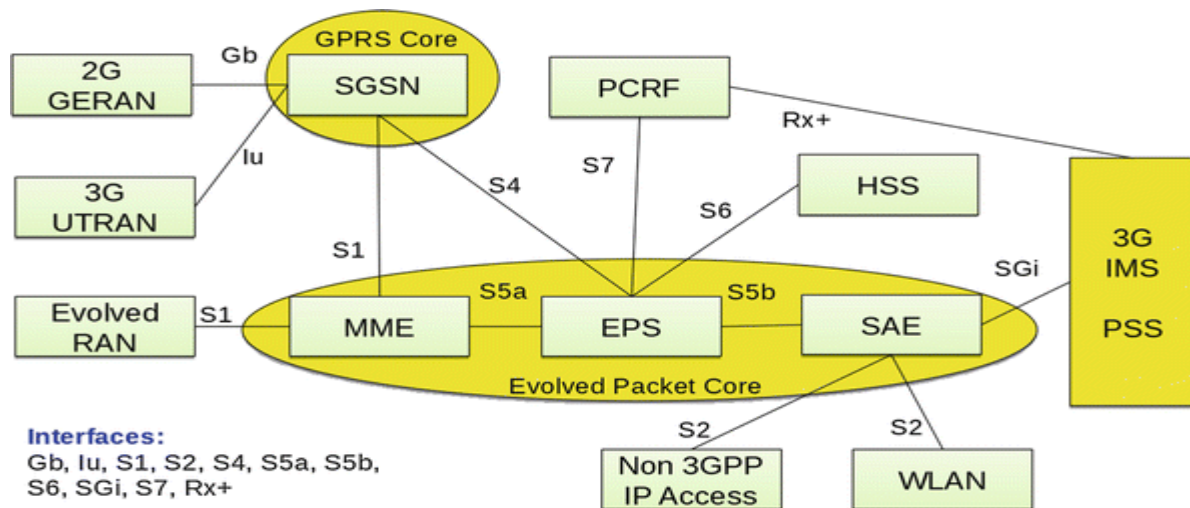


Figure: Architectural diagram of 4g and 5g Network



Basic components of LTE:

SGSN – Serving GPRS Support Node (GPRS)
SAE – 3GPP System Architecture Evolution
GERAN – GSM EDGE Radio Access Network (EDGE)
UTRAN – UMTS Terrestrial Radio Access Network (UMTS)
IMS – IP Multimedia Subsystem
RAN – Radio Access Network

PSS – Packet-switched Streaming Service
PCRF – Policy and Charging Rules Function
EPS – Evolved Packet System
EPC – Evolved Packet Core
HSS – Home Subscriber Server
MME – Mobility Management Entity
IASA – Inter-Access System Anchor
UPE – User Plane Entity

Source: 3GPP

Figure: Architectural diagram of 2g and 3g Network

QUESTION 1ii

Outline the advantage and disadvantages of 3g, 4g and 5g.

Solution

ADVANTAGES OF 5G

- i. Increase bandwidth for all users
- ii. Faster speed
- iii. New Technology Options May Become Available on a 5G Network

DISADVANTAGE OF 5G

- i. An Increased Bandwidth will mean Less Coverage.
- ii. The Radio Frequency May Become a Problem

ADVANTAGES OF 3G

- i. Faster data rates.
- ii. Support multimedia applications such as video and photography.
- iii. Value added services like mobile television, GPS, video call and video conference.
- iv. High speed mobile internet access.
- v. Increased capacity.

DISADVANTAGES OF 3G

- i. Requires 3G compatible handsets.
- ii. The cost of upgrading to 3G device is expensive.
- iii. Power consumption is high.

iv. 3G requires closer base stations which is expensive.

ADVANTAGES OF 4G

- i. Quickly download files over a wireless network.
- ii. Extremely high voice quality.
- iii. Easily access Internet, IM, social networks, streaming media, video calling.
- iv. Higher bandwidth.
- v. 4G is 10 times faster than 3G.

DISADVANTAGES OF 4G

- i. Higher data prices for consumers.
- ii. It is very expensive and hard to implement.

QUESTION 2

In a tabular form, establish adequate differences between 2g, 3g, 4g and 5g

SOLUTION

COMPARISON	2G	3G	4G	5G
Technology	Gsm	WCDMA	LTE,WiMAX	MIMO, mm Waves
Access System	TDMA, CDMA	CDMA	CDMA	OFDM, BDMA
Internet Service	Narrow band	Broad band	Ultra-broad band	Wireless world wide web
Bandwidth	25 MHz	25 MHz	100 MHz	30GHz to 300 GHz
Application	Voice calls, short messages	Video conferencing, mobile TV, GPS	High speed application, mobile TV, wearable Device	High resolution video streaming, remote control of vehicles, robots and medical procedures

QUESTION 3

Recently in Nigeria there has been a wide spread of opinion that the advent of 5G evolution will aid the spread of the corona virus which has become a pandemic all over the world.

3i.

Is there any correlation between 5G and Corona Virus?

SOLUTION

NO, there is no correlation between 5G and Corona Virus. According to researches and tests of the World Health Organisation (WHO) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP), 5G is not harmful to health and it does not cause any disease,” he said.

3ii.

Do you support the state, if yes or No, in not more than 500 words justify your answer?

SOLUTION

I support the government in their decision towards the control of the pandemic in delta were I resident because;

It is the third time the Governor is making an effort to update Deltans through a state broadcast on the coronavirus pandemic.

The order also applies to all land borders in and out of Delta effective 6am, Sunday, March 29, 2020.

In order to stop the rapid spread of the coronavirus, the Governor also announced that all businesses-malls, supermarkets, markets and shops -are to close from Wednesday, April 1, 2020.

Food sellers are to conduct their businesses within the precinct of their homes and are required to strictly adhere to the social distancing rules, the governor said.

Consequently, the governor urged all Deltans to adjust to the new order and cooperate with the Government and law enforcement agencies.

“Drastic as these measures may seem, they are for our collective good. At the same time, we must keep on praying to God to save us from the seismic effects of this global pandemic.