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Semester # 8th

Degree # BSCS

Subject # wireless-
Networking

Final - Term paper

Date # 22-06-2020

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Question # 01:

a) List five ways of increasing the capacity of a cellular system?

The five ways of increasing the capacity of a cellular system are:

- 1) Adding new channels
- 2) Frequency borrowing
- 3) Cell splitting
- 4) Cell sectoring
- 5) microcells.

b) Briefly differentiate b/w 3G, 4G and 5G cellular networks?

(2)

3G-

This generation set the standards for most of the wireless technology we have come to know. web browsing, email, video downloading, Picture sharing and other smart phones technology were introduced in the third technology.

International mobile Telecommunication 2000 (IMT-2000) specifications by the international Telecommunication union. One of requirements set by IMT-2000 was that speed should be at least 200 kbps to call it as 3G service.

4G-

4G is a very different technology as compared to 3G and was made possible practically only because of the advancements

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technology in the last 10 years. Its purpose is to provide high speed, high quality and high capacity to users while improving security and lower the cost of voice and data services. High definition mobile TV, video conferencing, 3D television and cloud computing.

5G.

5G is a generation currently under development. That's intended to improve on 4G. 5G promises significantly faster data rates, higher connection density, much lower latency. Among other improvements. The max speed of 5G is aimed at being as fast as 35.46 Gbps, which is over 35 times faster than 4G.

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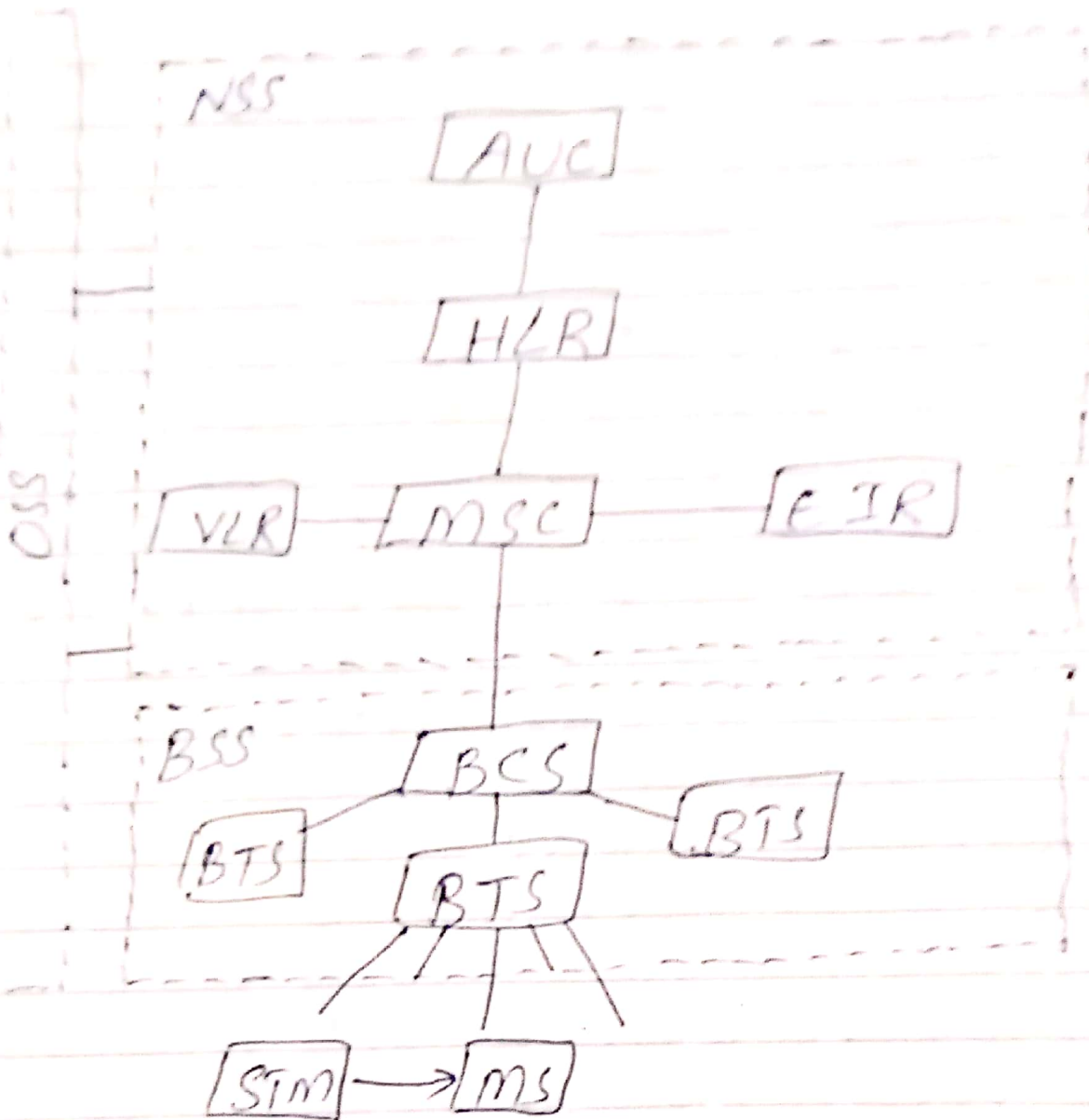
c) Briefly Explain Overall GSM Architecture with the help of diagram?

GSM Network

Architecture :

The GSM network architecture consists of different elements including Base Station Subsystem (BSS), Network and Switching Subsystem (NSS), Operation and Support Subsystem (OSS) as well as elements including MSC, AuC, HLR, VLR etc.

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e) what are the current and future cellular network issues and challenges?

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Challenges To Future Mobile Networks

The main objective of future mobile network is to integrate all mobile network by providing the roaming and seamless handover facility b/w different cellular networks and public private unlicensed, hence raising different challenges:

- * Efficient utilization of network resources in CHN environment.
- * Maintaining the certain level of QoS for user application.
- * Cooperative network management.
- * An intelligent billing policy.

(7)

Question # 02

Q) what are two different types of destination addresses that can be assigned to a mobile node while it is attached to foreign network?

There are two different types of destination addresses that can be assigned to a mobile node while it is attached to foreign network. They are:

- 1) Home address
- 2) Care-of address.

(8)

h) What is tunneling?

Tunneling:

Tunneling is a protocol that allows for the secure movement of data from one network to another. Tunneling involves allowing private network communication to be sent across a public network. Such as the internet. through a process called encapsulation.

i) Briefly explain WAE, WSP, WTP, WTLS, WDP and WMP protocols in WAP - protocol stack?

WTLS:

Wireless Transaction
Layer Security:

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The WTLS layer implementation is a security protocol based on the TLS industry standard. WTLS is intended for use with the WAP transport protocols and has following features.

- * Data integrity.
- * Confidentiality.
- * Authentication.
- * Denial-of-Service Protection.

WDP:

The WDP layer operates on various bearers that depends on the used network type. WDP offers a consistent interface for the upper layer, so that the communication occurs transparently using one of the available bearer service.

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WSP - wireless session protocol:

The wireless session protocol (WSP) implements an interface for connection-oriented and connectionless session service. The connection-oriented session service operates using the protocol at the transaction layer.

WTP - wireless transaction protocol:

The wireless transaction protocol (WTP) is a transaction-oriented protocol, executed using a data gram service. WTP offers the following functions:

- * Unreliable one-way requests
- * Reliable one-way request
- * * Reliable two-way request.

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WCMP - wireless Control message protocol:

The wireless control message protocol defines the error reporting mechanism for WDP diagrams as well as the protocol elements that can be used for diagnosis and informational purpose.

WAE - wireless Application

Environment:

The wireless Application Environment (WAE) defines the following functions:

- * wireless markup language (WML)
- * WML script.

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- * wireless telephony Application
- * Content format.

Question # 4

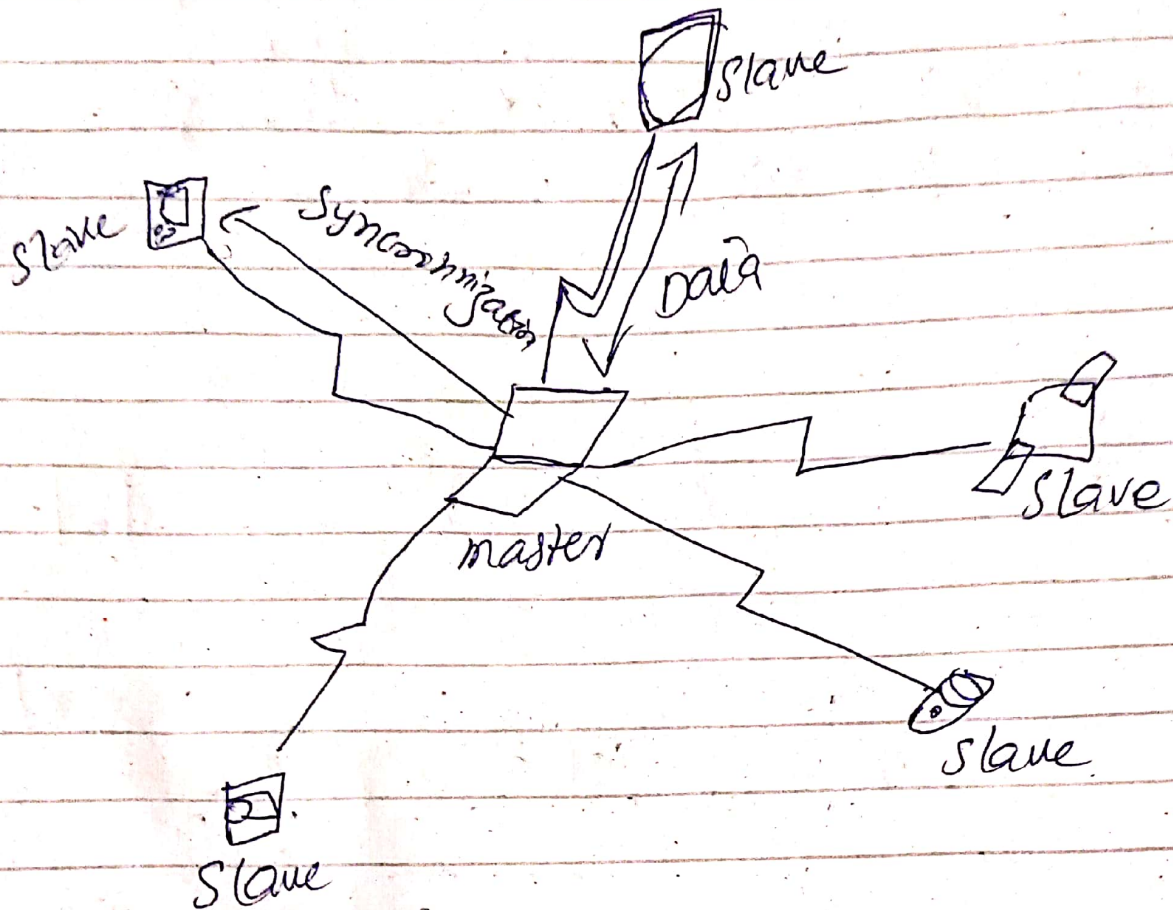
- b) Briefly differentiate b/w Piconets and Scatternets? Explain with the help of diagram.

PICONET:

Bluetooth is WPAN (wireless personal Area network) open standard that provides an adhoc way of connecting devices in the 10m range.

upto eight devices can be connected in a Bluetooth network called PICONET.

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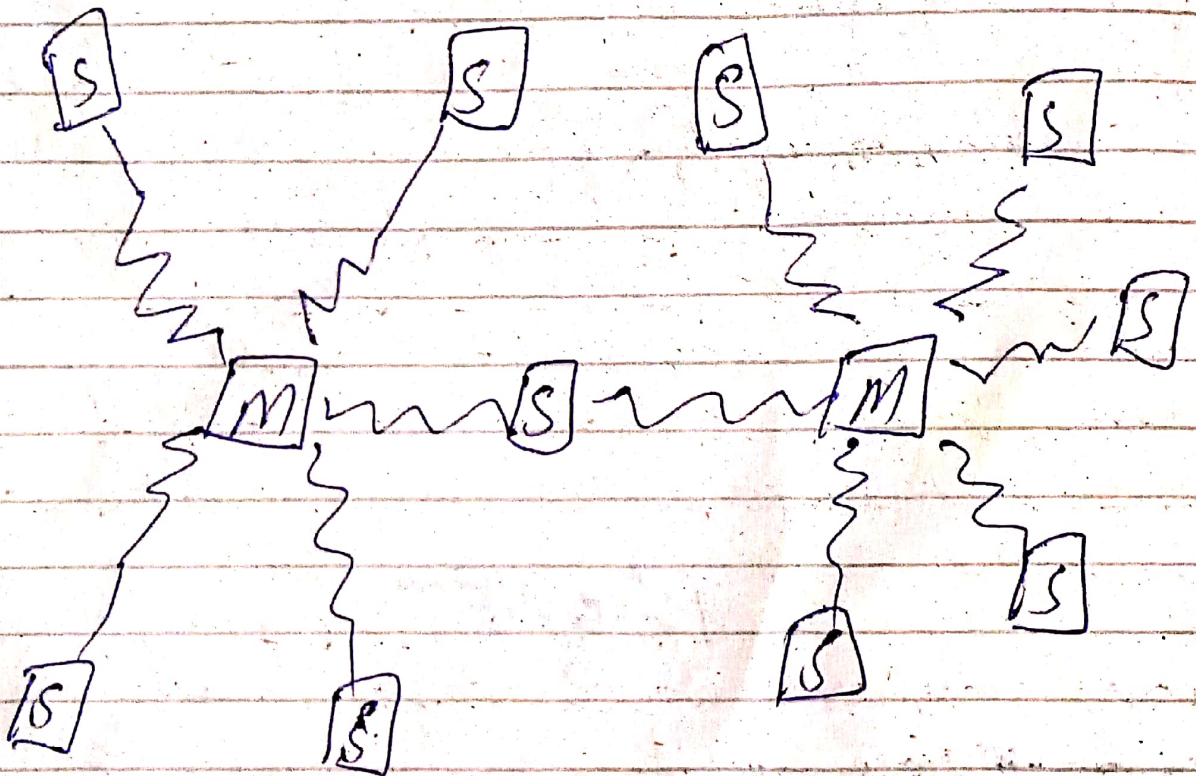
PICONET

SCATTERNET:

Eight devices can be considered in Bluetooth network is called piconet. One of them acts as a master and other acts as slaves.

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A scatter-net is formed when two or more piconets connect through a bridge node.



SCATTERNET

(15)

c) Define L2CAP data packet format?

L2CAP Data Packet Format:

L2CAP is packet-based but follows a communication model based on channels. A channel represents a data flow b/w L2CAP entities in remote devices. Channels may be connection-oriented or connectionless. All packet fields used little Endian byte order.

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Question # 2 (7)

Answer

Three Basic Capabilities:

Discovery: In order to identify prospective home agents and foreign agents, a mobile node uses agent discovery.

Registration: an authenticated registration procedure is used to inform its home agent of its care-of address.

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Tunneling: IP datagrams
are forwarded
from a home address
to a care-of
address.

Question # 3

(a)

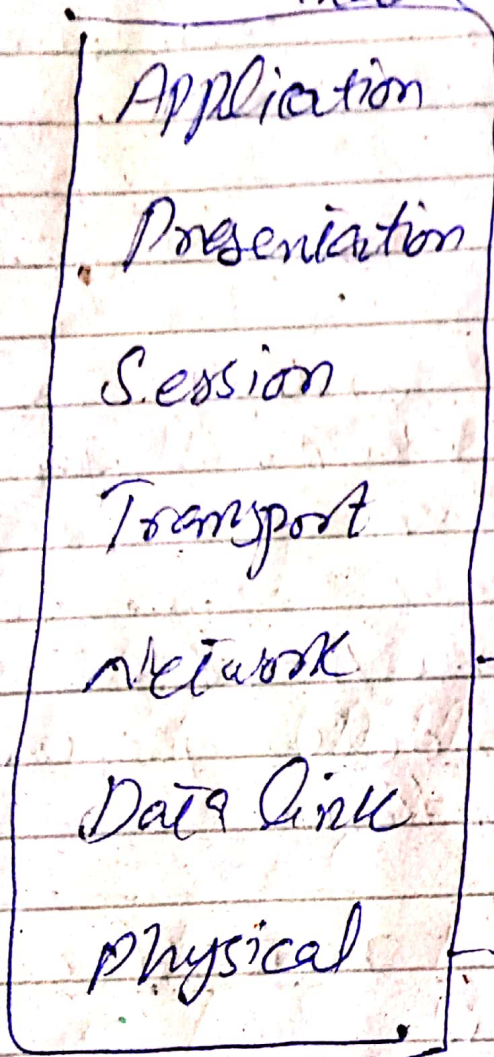
Answer

The architecture of a LAN
is best described in
terms of a layering of
protocols that organize
the basic function of
a LAN - which encompasses
physical, medium access
control, and logic link
control layer.

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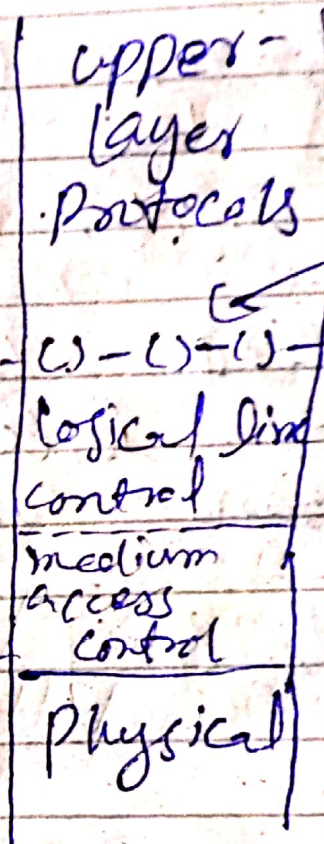
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OSI reference model



medium

IEEE 802 reference model



medium

LLC service access point (LSAP)

↑
scope of IEEE 802 standard

(20) (19)

Question # 4

(a) (i)

Answer

Bluetooth low energy that hit the market in 2011.

→ Ultra low peak, average and idle mode power consumption.

→ Ability to run for years.

→ Low cost

→ It is used in watches and toys.

Question 13)

(b)

Answer

802.11n - 802.11n builds upon previous 802.11 standard by adding multiple-input multiple output (MIMO).

The real speed would be 100 mbit/s (even 250 mbit/s in PHY level).

IEEE 802.11y-2008 or fast BSS transition (FT), also fast roaming, is an amendment to the IEEE 802.11.

802.11o Reserved and will not be used.

802.11s is a proposed amendment to the 802.11

(20) (21)

wireless networking Standard
that will provide a
vendor-neutral way to
build wireless network.
The IEEE has acknowledged
the need to provide users
with an objective means
of evaluating functionality
and performance of
802.11 products.

Question # 1

(d)

Answer

This is the only connection
made by this caller
during the course of
"an hour"

Therefore if started then
only 1 call takes place

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So number of calls = 1

minutes of traffic in the hour = number of call x duration

minutes of traffic in the hour = 1×35

minutes of traffic in the hour = 35

hours of traffic in the hours = $\frac{35}{60}$

Hours of traffic in the hours = 0.5833

Amount of traffic = 0.5833 Erlangs.