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CLASS - BE III^{Yrs} CSE-A (6th SEM)

SUBJECT - WIRELESS NETWORKS

ROLLNO - 17CG063

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ASSIGNMENT - III

Q1 Explain difference between wireless WAN and wireless LAN, what are their common features. Consider mode of operation, administration, frequencies, capabilities of nodes & services.

Following are some basic differences between the two:

Attributes	WLAN	WWAN
Abbreviation	WLAN stands for wire less Local area network. It is also called WLAN that is Local area wireless network	WWAN stands for wireless wide area network.
Performance	The performance of WLAN is high compared to other wireless network	The performance of WWAN is low compared to other wireless network.
Coverage	It is covered within a campus or building or that tech paul	It is established world wide.
Application	It is used in the mobile propagation of wired networks	It is applied to mobile devices from the internet or outdoor access via multiple Satellite

system referred to as a spectrum of 4G or 3G.

Technology

It is a temporary network formed with a limited number of users in short range without a access point or network resources.

It belongs to the family of GSM, CDMA or CDMA 2000. Belong to cellular family to transmit and receive data.

Standard

The standards of WLAN are IEEE802.11 WiFi and IEEE802.11.

The standard of WWAN are maximum in 2G and 3G.

Services

It offers services to the desktop, laptop mobile application and all the devices work on the internet.

It provides services only to smartphone and tablets.

Installation set up

WLAN is an affordable method and can be set up in 24 hrs.

Replacement of connecting tool WWAN is costly and ISP contract should be made for internet service access which is high.



Q: Security

WLAN is not secure as WWAN.

WWAN provides the best security than WLAN because of its 128 bit encryption.

Speed

WLAN operates faster than WWAN because of its short range establishment.

It is not fast as WLAN since it has a global range of access.

Mode of operation

WLAN doesn't use telecom for its operation.

WWAN uses telecom for its operation.

Capabilities of nodes

WLAN technologies like wifi have a much shorter range and you would need a lot of nodes to cover a large area.

WWAN adopt technology from mobile telecommunication network that are already suited for covering large areas.

Frequencies

2.4 GHz & 5 GHz

900 MHz, 1800 MHz &
1900 MHz

Similarities :-

- WLAN and WWAN are both forms of wireless network which provides a connectivity on the earth.

So far one is within the range, the network can be connected to, and the services like email, ~~internet~~ internet, file storage can be accessed.

- Q2. What are the various IEEE standard? Explain
 The IEEE 802 standard comprises a family of networking standards that cover the physical layer specification

802. Overview Basics of physical and logical networking concepts

802.1 Bridging LAN/MAN Bridging and management
 Covers management and the lower sub layers of OSI layer 2, including MAC-based bridging (MAC), virtual LANs and port-based access control.

802.2 logical link The LLC is the top sub-layer in the data link layer, OSI layer 2.

802.3 Ethernet "Grandaddy" of the 802 specification provides asynchronous networking among "Carrier Sense Multiple Access with Collision Detect"

802.4	TOKEN-bus	Disbanded
802.5	TOKEN-ring	The original token-passing standard for twisted pair shielded copper cables. Support copper and fibre cabling from 4 mbps to 100mbps.
802.6	Distributed bus dual bus	It incorporates and supersedes published standards 802.1j & 802.6K
802.7	Broad band LAN-practices	Withdrawn standard
802.8	fibre optic practices	Withdrawn standard
802.9	Integrated services LAN	Withdrawn standard
802.10	Interoperable LAN security	Superseded ** contains IEEE 802.10 b-1992
802.11	Wifi	Wireless LAN media Access control and physical layer specification, 802.11 a, b, g etc are amendment to the original 802.11 standard

- 802.11a
 - specifies a PHY that operates in the 5GHz UNII band
 - Uses orthogonal frequency division multiplexing
 - enhanced data speed to 54 Mbps
 - Ratified after 802.11b

- 802.11b
 - Enhancement to 802.11 that added higher data rate modes to DSSS already defined in the original 802.11 standard.
 - Boosted data speed to 11 mbps
 - Because at 1 mbps, falls back to 5.5, 2 or 1 mbps from 11 mbps max.

- 802.11d
 - enhancement to 802.11a & 802.11b that allow for global roaming
 - Particular can be set a MAC layer.

- 802.11e
 - enhancement to 802.11 than include quality of service features
 - facilitates prioritization of data, voice and video transmission

- 802.11g
 - Extend the maximum data rate of WLAN devices that operate in the 2.4 GHz band, in a fashion that permits interop.



with 802.11 b devices

- Operates at upto 54 mbps with fallback speed that include the 'b' speeds.

802.11 h : It resolves interference issues

802.11 i : offers additional security for WLAN application

802.11 j : Japanese regulatory extensions to 802.11 a specification

802.11 k : Radio resource management for network using 802.11 family specification

802.11 m : maintenance of 802.11 family

802.11 n : Higher speed standard

Q3 Explain IEEE 802.11. Why physical layer in IEEE 802.11 is subdivided?

IEEE 802.11 refers to the set of standard that defines communication for wireless LAN (wireless Local area network, or WLAN). The technology behind 802.11 is branded to consumers as WiFi.

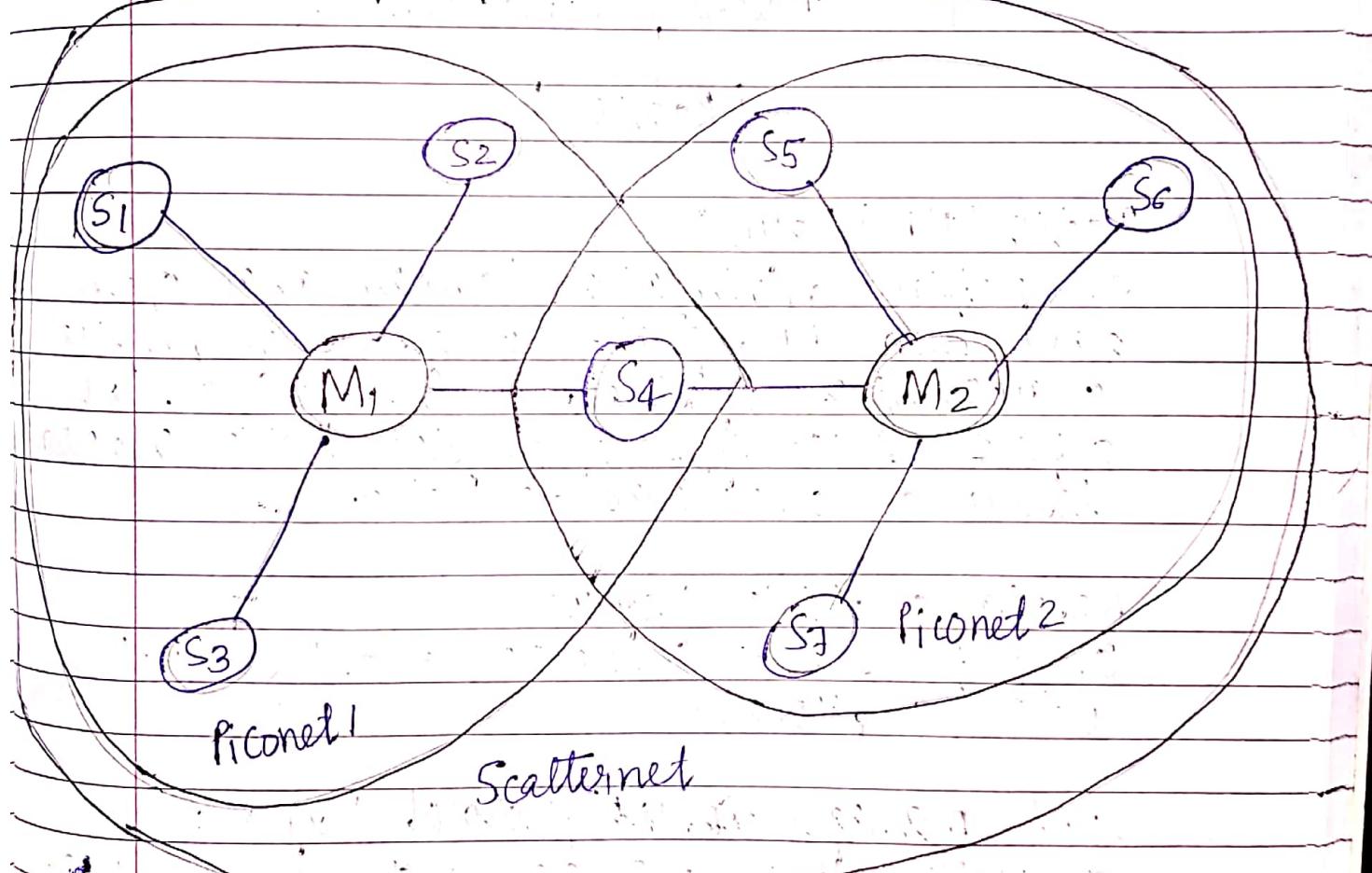
As the name implies IEEE 802.11 is overseen by the IEEE ; specifically the IEEE LAN / MAN standard committee (IEEE 802). The current

version of the standard is IEEE 802.11 - 2007. IEEE 802.11 is the set of technical guidelines for implementing Wi-Fi. Selling products under this trade mark is overseen by an industry trade association by the name of the Wi-Fi Alliance. IEEE 802.11 has its roots from a 1985 decision by the US Federal Commission for communication that opened up the ISM band for unlicensed use. The standard was formally released in 1997. That original standard was called IEEE 802.11-1997 and is now obsolete. It's common to hear people refer to 802.11 standards or the "802.11 family of standards". However, to be more precise, there is only one standard (IEEE 802.11-2007) but many amendments. Commonly known as Amendments include 802.11a, 802.11b, 802.11g and 802.11n.

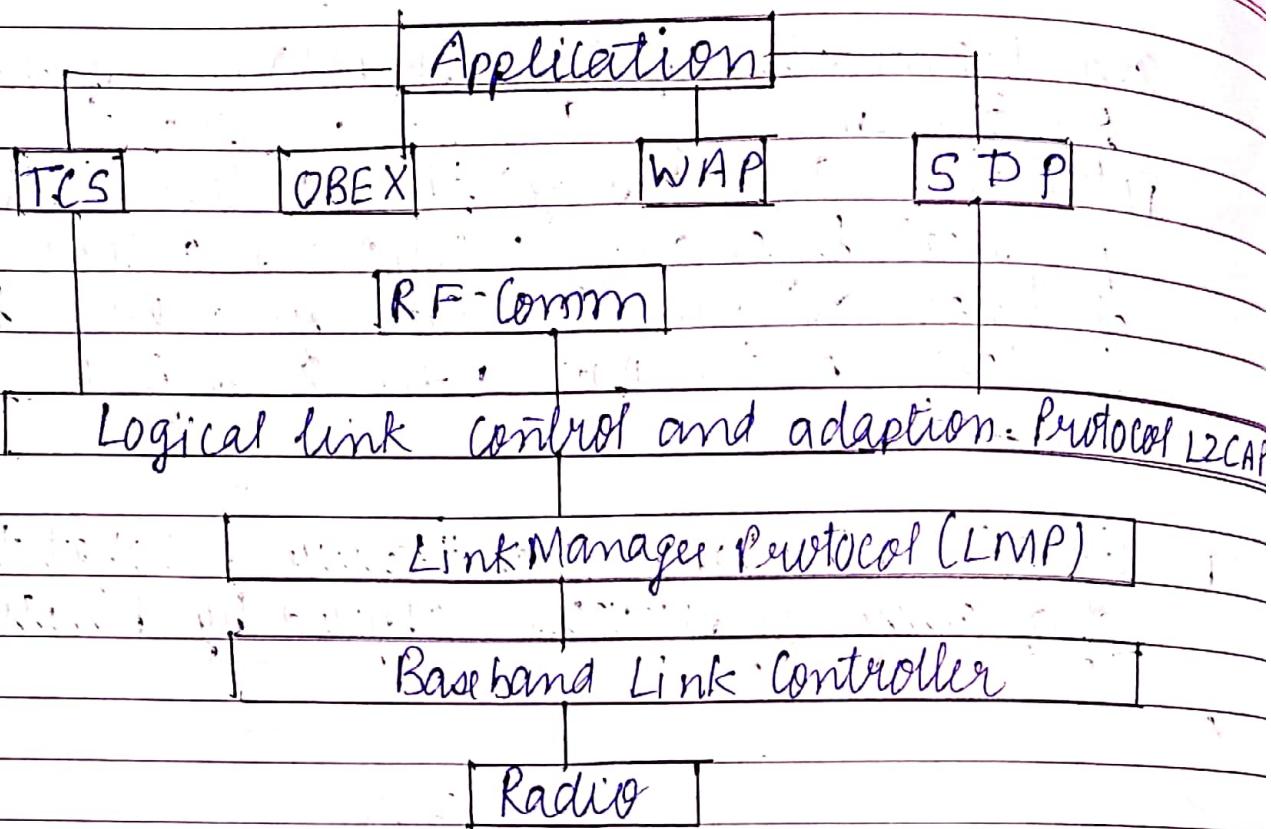
The physical layer is divided into two sublayers: the Physical Layer Convergence Procedure (PLCP) sublayer and Physical Medium Dependent (PMD) sublayer. The PLCP is the glue b/w the frames of the MAC and the Radio transmission in the air. It adds its own header. Normally frames include a preamble to help synchronize incoming transmission. The requirements of the preamble may depend on the modulation method; however, so the PLCP adds its own header to

any transmitted frames. The PMA is responsible for transmitting any bits it receives from PLCP into air using the antenna. The physical layer also incorporates a clear channel assessment (CCA) function to indicate to the MAC when a signal is detected.

Q4 Explain Bluetooth architecture. What type of quality of services offered by Bluetooth.



A bluetooth network is called Piconet and a collection of inter connected piconet is called Scatternet.



Radio (RF) Layer:

It performs modulation / demodulation of the data into RF signal. It defines the physical characteristics of bluetooth transceiver. It defines two types of physical link: connectionless and connection-oriented.

Baseband Link Layer:

It performs the connection establishment with a piconet.

Link Manager ~~and~~ protocol Layer :

It performs the management of the already established links. It also includes authentication and encryption processes.



Logical Link Control and Adaption protocol layer:

It is also known as the heart of the bluetooth protocol stack. It allows the communication between upper and lower layers of the bluetooth protocol stack. It packages the data packets received from upper layer into the form expected by lower layers. It also performs the segmentation and multiplexing.

SDP Layer:

It is short for Service Discovery Protocol. It allows to discover the services available on another bluetooth enabled device.

RF comm layer:

It is short for Radio Frontend Component. It provides serial interface with WAP and OBEX.

OBEX:

It is short for Object Exchange. It is a communication protocol to exchange objects b/w 2 devices.

WAP:

It is short for Wireless Access Protocol. It is used for internet access.

TCS:

It is short for Telephony Control Protocol. It

provides telephony service

Application Layer

It enables the user to interact with the application.

Services offered by Bluetooth:

- Absolute Volume Control
- Advanced audio codecs
- Telephony.

Q5 What is WiMAX and Zigbee?

WiMAX -

- It is one of the hottest broadband wireless technologies around today. WiMAX systems are expected to deliver broadband access services to residential and enterprise customers in an economical way.
- Loosely, WiMAX is standardized wireless version of Ethernet intended primarily as an alternative to wire technologies such as Cable Modems, DSL and T1/E1 links to provide broadband access to customer premises.
- More strictly, WiMAX is an industry trade organization formed by leading communications, component and equipment companies to promote and certify compatibility and interoperability of broadband wireless

access equipment that conforms to the IEEE 802.16 and ETSI 'HiperMAN' standards.

- WiMax would operate similar to WiFi, but at higher speed over greater distances and for a greater number of users.
- WiMax has the ability to provide service even in areas that are difficult for wired infrastructure to reach and the ability to overcome the physical limitation of traditional wired infrastructure.
- WiMax was formed in April 2001, in anticipation of the publication of the original 10-GHz IEEE 802.16 specifications. WiMax is to 802.16 as the WiFi Alliance is to 802.11.

Zigbee -

- Zigbee is a wireless technology developed as an open global standard to address the unique needs of low-cost, low power wireless IoT networks. The Zigbee standard operates on the IEEE 802.15.4 physical radio specification and operates in unlicensed bands including 2.4 GHz, 900 MHz and 868 MHz.
- The 802.15.4 specification upon which the Zigbee stack operates gained

ratification by the Institute of Electrical and Electronics (IEEE) in 2003. The specification is a packet based radio protocol intended for low-cost, battery-operated devices. The protocol allows devices to communicate in a variety of network topologies and can have battery life lasting several years.