MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

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Rasipuram - 637 408, Namakkal Dist., Tamil Nadu

Estd. 2000

IQAC

Must Know Concepts (MKC)

CSE

2021-2022

Subject		19CSC14/MOBILE COMMUNICATION		
S. No.	**Term**	**Notation (Symbol)**	**Concept/Definition/Meaning/Units/Equation/ Expression**	**Units**
UNIT –I- WIRELESS COMMUNICATION FUNDAMENTALS				
1.	Mobile Computing		Mobile Computing is a technology that allows transmission of data, voice and video via a computer or any other wireless enabled device without having to be connected to a fixed physical link.	
2.	Mobile communication		Mobile communication is talking, texting or sending data or image files over a wireless network	
3.	Applications of Mobile Computing		• Vehicles • Emergencies • Business • Replacement of wired networks • Infotainment • Location dependent services • Mobile and wireless devices	
4.	Frequency	f	The number of waves that pass a fixed point in unit time; also, the number of cycles or vibrations undergone during one unit of time by a body in periodic motion.	
5.	wavelength	λ	$\lambda = c/f$. where $c \cong 3 \cdot 108$ m/s (the speed of light in vacuum) and f the frequency	
6.	ITU		The International Telecommunication Union is a specialized agency of the United Nations responsible for all matters related to information and communication technologies	
7.	CCIR		The CCIR is a standards body responsible for many of our audio and video standards over the years	
8.	amplitude	A	The definition of amplitude refers to the length and width of waves, such as sound waves, as they move or vibrate	
9.	Signal		Signals are functions of time and location	
10.	General function of sine wave		$g(t) = At \sin(2 \pi ft\ t + \varphi t)$. Signal parameters are the amplitude A, the frequency f, and the phase shift φ	
11.	Antenna		Antenna, also called Aerial, component of radio, television, and radar systems that directs incoming and outgoing radio waves	
12.	Signal propagation		signal propagation is the movement of these radio waves (which move at the speed of light) to and from these sites and devices	
13.	Interference		Modifies a signal in a disruptive manner, as it travels along a communication channel between its source and receiver	

14.	Ground wave	<2 MHz	Waves with low frequencies follow the earth's surface and can propagate long distances	
15.	Sky wave	2–30 MHz	The waves can bounce back and forth between the ionosphere and the earth's surface, travelling around the world	
16.	Line-of-sight	>30 MHz	Straight line exists between a sender and a receiver called LOS. Mobile phone systems, satellite systems, cordless telephones etc. use even higher frequencies	
17.	Attenuation		Attenuation is the loss of signal strength in networking cables or connections	
18.	Multiplexing		Multiplexing describes how several users can share a medium with minimum or no interference	
19.	Dimensions of Multiplexing		1. Space Division multiplexing (SDM) 2. Time Division multiplexing (TDM) 3. Frequency Division multiplexing (FDM) 4. Code Division multiplexing (CDM)	
20.	Modulation		Modulation is the process of converting data into electrical signals optimized for transmission.	
21.	Methods of Modulation		1. Amplitude Shift Keying (ASK) 2. Frequency shift keying (FSK) 3. Phase shift keying (PSK) 4. Advanced frequency shift keying (AFSK) 5. Advanced phase shift keying (APSK)	
22.	Spread Spectrum		Spread Spectrum is a technique in which the transmitted signals of specific frequencies are varied slightly to obtain greater bandwidth as compared to initial bandwidth	
23.	Types of Spread Spectrum		1. Direct Sequence Spread Spectrum (DSSS) 2. Frequency Hopping Spread Spectrum (FHSS)	
24.	Base Station		[A mobile phone base station is] a transmission and reception station in a fixed location, consisting of one or more receive/transmit antenna, microwave dish, and electronic circuitry, used to handle cellular traffic.	
25.	Cluster		A collection of cells (non repetitive) frequencies	
UNIT –II- TELECOMMUNICATION NETWORKS				
26.	Global System for Mobile Communications	GSM	It is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile devices such as mobile phones and tablets	
27.	Mobile Station	MS	A mobile station comprises all user equipment and software needed for communication with a mobile network.	
28.	Public Switched Telephone Network	PSTN	It is a combination of telephone networks used worldwide, including telephone lines, fiber optic cables, switching centers, cellular networks, satellites and cable systems	
29.	Integrated Services Digital Network	ISDN	It is a circuit-switched telephone network system that transmits both data and voice over a digital line	
30.	Terminal		It is a computerized device used on mobile devices to communicate with a centralized control system.	
31.	Radio Link Protocol	RLP	The main function of the RLP is to conceal the channel related losses from TCP by quickly recovering the dropped packets by means of local retransmissions.	
32.	High-Level Data Link Control	HDLC	It is a group of communication protocols of the data link layer for transmitting data between network points or nodes.	

33.	Enhanced Message Service	EMS	Enhanced Messaging Service is an extension of SMS, which allowed mobile phone to send and receive messages that have special text formatting.	
34.	Multimedia Message Service	MMS	Multimedia Messaging Service (MMS) is a standard way to send messages that include multimedia content to and from a mobile phone over a cellular network	
35.	GSM Subsystems		1. radio sub system (RSS), 2. network and switching subsystem (NSS), 3. operation subsystem (OSS)	
36.	Base station subsystem	BSS	The BSS performs all functions necessary to maintain radio connections to an MS, coding/decoding of voice, and rate adaptation to/from the wireless network part	
37.	Base Transceiver Stations	BTS	A BTS comprises all radio equipment, i.e., antennas, signal processing, amplifiers necessary for radio transmission	
38.	Base station controller	BSC	The BSC basically manages the BTSs. It reserves radio frequencies, handles the handover from one BTS to another within the BSS, and performs paging of the MS	
39.	Mobile Services Switching Center	MSC	MSC manages several BSCs in a geographical region.	
40.	Home Location Register	HLR	The HLR is the most important database in a GSM system as it stores all user-relevant information	
41.	Visitor Location Register	VLR	The VLR associated to each MSC is a dynamic database which stores all important information needed for the MS users currently in the LA that is associated to the MSC	
42.	Operation Subsystem	OSS	Contains the necessary functions for network operation and maintenance	
43.	Operation and Maintenance Center	OMC	The OMC monitors and controls all other network entities via the O interface	
44.	Equipment Identity Register	EIR	The EIR is a database for all IMEI	
45.	General Packet Radio Service	GPRS	General Packet Radio Service (GPRS) is a packet-based mobile data service on the global system for mobile communications (GSM) of 3G and 2G cellular communication systems	
46.	Digital Enhanced Cordless Telecommunications	DECT	It is a digital wireless technology for telephony that is used both for home and business.	
47.	Digital Audio Broadcasting	DAB	Analog audio is converted into a digital signal and transmitted on an assigned channel in the AM or (more usually) FM frequency range	
48.	Digital Video Broadcasting	DVB	DVB is a common standard for digital television and video used in many parts of the world. DVB standards include DVB-T for terrestrial television, DVB-C for cable television, and DVB-S for satellite television	
49.	Fixed-assigned multiple access	FAMA	Each user is allocated a channel permanently, whether they use it or not.	
50.	Demand Assigned Multiple Access	DAMA	Technology used to assign a bandwidth to clients that don't need to use it constantly.	
UNIT –III Wireless LAN				
51.	Wireless LAN		WLAN is one in which a mobile user can connect to a Local Area Network (LAN) through a wireless connection	
52.	AP		An access point is a wireless network device that acts as a portal for devices to connect to a local area network	
53.	Switch		A switch is a device in a computer network that connects other devices together. Multiple data cables are plugged into a switch to enable communication between different networked devices.	

54.	Ad-hoc wireless networks		Wireless ad hoc networks are distributed networks that work without fixed infrastructures and in which each network node is willing to forward network packets for other network nodes	
55.	IEEE 802.11		IEEE 802.11 standard, popularly known as WiFi, lays down the architecture and specifications of wireless LANs (WLANs).	
56.	BSS		The radio components of a BSS may consist of four to seven or nine cells. A BSS may have one or more base stations. The BSS uses the Abis interface between the BTS and the BSC.	
57.	BTS		The BTS houses the radio transceivers that define a cell and handles the radio link protocols with the MS	
58.	ESS		A distribution system connects several BSSs via the AP to form a single network and thereby extends the wireless coverage area.	
59.	Physical Layer Convergence Protocol (PLCP)		PLCP sublayer provides a carrier sense signal, called clear channel assessment (CCA), and provides a common PHY service access point (SAP) independent of the transmission technology.	
60.	DLC		DLC (data link control) is the service provided by the Data Link layer of function defined in the Open Systems Interconnection (OSI) model for network communication	
61.	PMD		Physical Medium Dependent. PMD sublayer handles modulation and encoding/decoding of signals.	
62.	Header error check (HEC)		Header error check (HEC) Signal, service, and length fields are protected by this checksum using the ITU-T CRC-16 standard polynomial	
63.	IrDA		IrDA provides specifications for a complete set of protocols for wireless infrared communications, and the name "IrDA" also refers to that set of protocols.	
64.	Distributed Coordination Function (DCF),		DCF employs a carrier-sense multiple access with collision avoidance (CSMA/CA) with binary exponential backoff algorithm.	
65.	Point Coordination Function (PCF)		It is a medium access control (MAC) sublayer technique used in areas where carrier-sense multiple access with collision avoidance (CSMA/CA) is used.	
66.	Short inter-frame spacing (SIFS)		The shortest waiting time for medium access (so the highest priority) is defined for short control messages, such as acknowledgements of data packets or polling responses.	
67.	PCF inter-frame spacing (PIFS)		A waiting time between DIFS and SIFS (and thus a medium priority) is used for a time-bounded service.	
68.	DCF inter-frame spacing (DIFS)		This parameter denotes the longest waiting time and has the lowest priority for medium access.	
69.	High Performance Local Area Network (HIPERLAN)		HIPERLAN uses cellular-based data networks to connect to an ATM backbone.	
70.	wireless, mobile ATM (WATM)		WATM systems had to be designed for transferring voice, classical data, video, multimedia etc	
71.	Handover		Handover or hand off is a process in telecommunication and mobile communication in which cellular transmission (voice or data) is transferred from one base station (cell site) to another without losing connectivity to the cellular transmission	
72.	L2CAP		logical link control and adaptation protocol (L2CAP) is a data link control protocol on top of the baseband layer offering logical channels between Bluetooth devices with QoS properties.	

73.	Service Delivery Platform (SDP)		It is a set of components that provides a service(s) delivery architecture (such as service creation, session control and protocols) for a type of service delivered to consumer, whether it be a customer or other system	
74.	Link Manager Protocol (LMP)		manages various aspects of the radio link between a master and a slave and the current parameter setting of the devices.	
75.	Piconet		A piconet is a small Bluetooth network that connects mobile devices wirelessly over a short range of 10m radius, using ultra-high frequency (UHF) radio waves, to form a personal area network (PAN).	
UNIT IV- MOBILE NETWORK LAYER				
76.	Mobile IP		Mobile IP is a communication protocol (created by extending Internet Protocol, IP) that allows the users to move from one network to another with the same IP address.	
77.	Requirements of Mobile IP		• Compatibility • Transparency • Scalability and efficiency • Security • Entities and terminology	
78.	Home Network		A home network is a group of devices – such as computers, game systems, printers, and mobile devices – that connect to the Internet and each other	
79.	Mobile Node	MN	The mobile node is an end system or device such as a cell phone, PDA (Personal Digital assistant), or laptop whose software enables network roaming capabilities.	
80.	Home Agent	HA	The home agent provides several services for the mobile node and is located in the home network.	
81.	Foreign Agent	FA	The foreign agent can provide several services to the mobile node during its visit to the foreign network	
82.	Care of Address	COA	The Care- of- address defines the current location of the mobile node from an IP point of view	
83.	Correspondent Node	CN	At least one partner is needed for communication. The correspondent node represents this partner for the MN. The correspondent node can be a fixed or mobile node.	
84.	Foreign network		The foreign network is the current subset the MN visits and which is not the home network.	
85.	DHCP		Dynamic Host Configuration Protocol (DHCP) is a network management protocol used to dynamically assign an IP address to nay device, or node, on a network so they can communicate using IP (Internet Protocol).	
86.	Mobile Ad hoc Networks		MANET stands for Mobile adhoc Network also called a wireless adhoc network or adhoc wireless network that usually has a routable networking environment on top of a Link Layer ad hoc network	
87.	Routing		Routing is the process of finding the best path for traffic in a network, or across multiple networks.	
88.	DSDV		Destination Sequenced Distance Vector (DSDV) is a hop-by-hop vector routing protocol requiring each node to periodically broadcast routing updates.	
89.	DSR		The Dynamic Source Routing protocol (DSR) is a simple and efficient routing protocol designed specifically for use in multi-hop wireless ad hoc networks of mobile nodes.	

90.	IETF		Internet Engineering Task Force standard communications protocol designed to allow mobile devices' (such as laptop, PDA, mobile phone, etc.) users to move from one network to another while maintaining their permanent IP (Internet Protocol) address.	
91.	RFC		Request for Comments is a formal document from the Internet Engineering Task Force (IETF) that is the result of committee drafting and subsequent review by interested parties	
92.	Router		Routing is the process of finding the best path for traffic in a network, or across multiple networks.	
93.	Tunneling		Tunneling is a protocol that allows for the secure movement of data from one network to another.	
94.	Encapsulation		It is the process of sending a packet via a tunnel and it is achieved by a mechanism called encapsulation.	
95.	GRE		Generic routing encapsulation (GRE) allows the encapsulation of packets of one protocol suite into the payload portion of a packet of another protocol suite	
96.	MIPv6		Mobile IPv6 (MIPv6) is a protocol developed as a subset of Internet Protocol version 6 (IPv6) to support mobile connections.	
97.	ICMP		Internet control message protocol creates and sends messages to the source IP address indicating that a gateway to the Internet that a router, service or host cannot be reached for packet delivery	
98.	HAWAII		Handoff-Aware Wireless Access Internet Infrastructure tries to keep micro-mobility support as transparent as possible for both home agents and mobile nodes	
99.	least interference routing (LIR)			
100.	Voice over Internet Protocol (VoIP)		It is a technology that allows you to make voice calls using a broadband Internet connection instead of a regular (or analog) phone line	
UNIT – V - TRANSPORT AND APPLICATION LAYERS				
101.	Transmission Control Protocol (TCP)		TCP is the transport layer protocol that serves as an interface between client and server.	
102.	Congestion control		Congestion control is a method used for monitoring the process of regulating the total amount of data entering the network so as to keep traffic levels at an acceptable value.	
103.	Slow start		Slow start prevents a network from becoming congested by regulating the amount of data that's sent over it. It negotiates the connection between a sender and receiver by defining the amount of data that can be transmitted with each packet, and slowly increases the amount of data until the network's capacity is reached	
104.	Round Trip Time	RTT	Round-trip time (RTT) is the duration, measured in milliseconds, from when a browser sends a request to when it receives a response from a server	
105.	Fast Retransmit		the congestion window is dropped down to 1 each time network congestion is detected	
106.	I-TCP		indirect transport layer protocol for mobile hosts. I-TCP utilizes the resources of Mobility Support Routers (MSRs) to provide transport layer communication between mobile hosts and hosts on the fixed network.	

107.	Snooping TCP		The basic concept is to buffer packets close to the mobile node and retransmit them locally if a packet is lost.	
108.	Mobile TCP		address problems related to lengthy or frequent disconnections.	
109.	time-out freezing		• Mobile hosts can be disconnected for a longer time • no packet exchange possible, e.g., in a tunnel, disconnection due to overloaded cells or mux.	
110.	go-back-n retransmission		Which the sending process continues to send a number of frames specified by a window size even without receiving an acknowledgement (ACK) packet from the receiver	
111.	Wireless Application Protocol	WAP	It is a protocol designed for micro-browsers and it enables the access of internet in the mobile devices.	
112.	Wireless Application Environment	WAE	It contains mobile device specifications and content development programming languages like WML.	
113.	Wireless Session Protocol	WSP	It provides fast connection suspension and reconnection.	
114.	Wireless Transaction Protocol	WTP	It runs on top of UDP (User Datagram Protocol) and is a part of TCP/IP and offers transaction support.	
115.	Wireless Transaction Layer Security	WTLS	It offers data integrity, privacy and authentication.	
116.	Wireless Datagram Protocol	WDP	It presents consistent data format to higher layers of WAP protocol stack	
117.	Fourth Generation	4G	Mobile phones provides broadband cellular network services and is successor to 3G mobile networks.	
118.	Long – Term Evolution	LTE	It is an extension of the 3G technology. It is a standard for high-speed mobile communication, based upon GSM/EDGE and UMTS/HSPA technologies	
119.	WIMAX		Worldwide Interoperability for Microwave Access. It offers peak data rates of 128 Mbps for downlink and 56 Mbps for uplink over 20 MHz wide channels.	
120.	Multiple-Input Multiple-Output	MIMO	is a wireless technology that uses multiple transmitters and receivers to transfer more data at the same time.	
121.	OFDM		orthogonal frequency-division multiplexing (OFDM) is a type of digital transmission and a method of encoding digital data on multiple carrier frequencies.	
122.	Mobile multimedia		Mobile multimedia is defined as a set of protocols and standards for multimedia information exchange over wireless networks.	
123.	Universal Mobile Telecommunications System	UMTS	UMTS uses wideband code-division multiple access (W-CDMA) radio access technology to offer greater spectral efficiency and bandwidth to mobile network operators.	
124.	TELNET		Telnet utility allows users to test connectivity to remote machines and issue commands through the use of a keyboard	
125.	File Transfer Protocol	FTP	It refers to a group of rules that govern how computers transfer files between systems over the internet.	
GATE QUESTIONS				
126.	SAMA		Spread Aloha Multiple Access is a combination of CDMA and TDMA.	

127.	Code Division Multiple Access	CDMA	Use codes with certain characteristics to separate different users. To enable access to the shared medium without interference	
128.	Several Versions In CSMA		• non-persistent CSMA • p-persistent CSMA • 1-persistent CSMA	
129.	FDD		In FDMA, the base station and the mobile station establish a duplex channel. The two directions, mobile station to base station and vice versa are separated using different frequencies. This Scheme is called Frequency Division Duplex (FDD)	
130.	p-persistent CSMA		p-persistent CSMA system nodes also sense the medium, but only transmit with a probability of p. With the station deferring to the next slot with the probability 1-p,	
131.	2 Sub Layers In DLC		Logical Link Control(LLC) Media Access Control(MAC)	
132.	Types Of Handover in GSM		1. Intra cell Handover 2. Inter cell Intra BSC Handover 3. Inter BSC Intra MSC handover 4. Inter MSC Handover	
133.	Categories Of Mobile Services		• Bearer services • Tele services • Supplementary services	
134.	GPRS		The General Packet Radio Service provides packet mode transfer for applications that exhibit traffic patterns such as frequent transmission of small volumes.	
135.	Subsystems in GSM System		• Radio subsystem (RSS) • Network & Switching subsystem(NSS) • Operation subsystem(OSS)	
136.	Information in SIM		• card type, serial no, list of subscribed services • Personal Identity Number (PIN) • Pin Unlocking Key (PUK) • An Authentication Key (KI)	
137.	Goals of DVB		The goal of DVB is to introduce digital TV broadcasting using satellite transmission (DVB-5) cable technology (DVB-c) and terrestrial transmission (DVB-7)	
138.	Mobile Routing		Even if the location of a terminal is known to the system, it still has to route the traffic through the network to the access point currently responsible for the wireless terminal.	
139.	Subscriber Identity Module	SIM	It is a small plastic card that contains some unique information.	
140.	Guard Space		The space between the channel interference ranges is known as guard space. Guard spaces are used to avoid frequency band overlapping or adjacent channel overlapping.	
141.	Multipath Propagation		When the sender emits the radio waves, these radio waves can travel along a straight line, or they may be reflected at a large building, or scattered at smaller obstacles.	
142.	Phase Lock Loop	PLL	The Phase Lock Loop or phase-locked loop (PLL) is a control system that is used to generate an output signal whose phase is related to the input signal's phase.	
143.	dwell time		The dwell time is the total amount of time spent on a channel with a specific frequency	

144.	hopping sequence		The hopping sequence is a pattern of channel usage used in Frequency Hpping Spread Spectrum (FHSS).	
145.	BSSGP		BSSGP stands for Base Station Subsystem GPRS Protocol. It is used to convey routing and QoS-related information between the BSS and SGSN.	
146.	Wireless Networking Standards		ITU,IEEE,ISO, IEEE 802.11 (a,bc,d,e,f..u)	
147.	ubiquitous computing		The aim of ubiquitous computing is to design computing infrastructures in such a manner that they integrate seamlessly with the environment and become almost invisible.	
148.	security services offered by GSM.		• Access control • Authentication • Confidentiality • Anonymity	
149.	Proactive (table-driven) protocols		Each node in the routing table maintains information about routes to every other node in the network	
150.	Reactive protocols		Nodes do not maintain up-to-date routing information New routes are discovered only when required	
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