

DEPARTMENT OF MCA
MC7503 MOBILE COMPUTING
III YEAR
UNIT I

1. List out the characteristics of communication devices? (Nov/Dec -2011)

- ▶ Fixed and wired
- ▶ Mobile and wired
- ▶ Fixed and wireless
- ▶ Mobile and wireless

2. What is Line-of-sight? (Nov/Dec -2011)

A straight line exists between a sender and a receiver it is called line-of-sight.

3. What is guard space?

Guard spaces are needed to avoid frequency band overlapping is also called channel interference.

4. What is the 3 different basic schemes analog modulation?

- ▶ Amplitude modulation
- ▶ Frequency modulation
- ▶ Phase modulation

5. What is multipath propagation?

Multipath propagation is the direct from a sender to a receiver the propagation effects mentioned in the previous section lead to one of the most severe radio channel impairments

6. What is hopping sequence?

Transmitter and receiver stay on one of these channels FDM and TDM. The pattern of channel usage is called the hopping sequence,

7. What are the advantages of cellular systems?

The advantages of cellular systems are,

- ▶ Higher capacity
- ▶ Less transmission power
- ▶ Local interface only
- ▶ Robustness

8. What is borrowing channel allocation and fixed channel allocation?

Cells with more traffic are dynamically allotted more frequencies. This scheme is known as borrowing channel allocation, while the first fixed scheme is called fixed Channel allocation.

9. What is modulation?

Modulation is the process of varying one or more properties of a high-frequency periodic wave form, called the carrier signal, with respect to a modulating signal (which typically contains information to be transmitted).

10. What is multiplexing?

Multiplexing is a fundamental mechanism in communication system. Multiplexing describes how several users can share a medium with minimum or no interference.

11. What are the 3 fundamental propagation behaviors depending on their frequency?

- ▶ Ground Wave
- ▶ Sky Wave
- ▶ Line of Sight.

12. What are the disadvantages of cellular systems?

The advantages of cellular systems are,

- ▶ Infrastructure needed
- ▶ Handover needed
- ▶ Frequency planning

13. What is digital sense multiple access?

The scheme which is used for the packet data transmission service Cellular Digital Packet Domain the AMPS mobile phone system is also known as digital sense multiple access (DSMA).

14. What is OVFSF?

Using orthogonal codes separates the different data streams of a sender UMT Successor called Orthogonal Variable Spreading factor codes (OVFSF).

15. Specify the steps perform during the search for a cell after power on?

- ▶ Primary synchronization
- ▶ Secondary synchronization
- ▶ Identification of the scrambling code

16. Why baseband signals cannot be directly transmitted in a wireless system?

- ▶ Antennas must be the order of magnitude of the signal's wavelength.
- ▶ Medium Characteristics.

17. Define beacon?

Beacon frame is used to convey timing information within a BSS. It contains a time stamp and other management information used for power management and roaming. The timestamp is used by the node to adjust its local clock.

18. What are the handovers in hiperLAN?

- ▶ The handovers in hiperLAN are
Sector handover
Radio handover
Network handover

19. Distinguish infrastructure and adhocnet works?

Infrastructure networks	Adhoc networks
Communication takes place only between a wireless node and an access point	Communication takes place only between two wireless nodes
The wireless node is simple as Functionality is based on the access point	The wireless node is complex
Can forward messages across Networks	Can forward messages only with in the specified range

20. Why is physical layer in IEEE802.11 subdivided? What are its sub layers?

The physical layer in IEEE802.11 is subdivided because a sub layer has to be dependent on the upper layers (architecture dependent) and the other has to be medium dependent. The two sublayers are namely,

- ▶ Physical layer convergence protocol
- ▶ Physical medium dependent sub layer

21. Define MSDU lifetime?

MSDU lifetime is used to provide time bounded service which specifies the maximum time that can elapse between sending and receiving a MSDU. It has arrange of 0-16000 ms.

22. What are the elements in core protocols in Bluetooth?

The elements in core protocols in Bluetooth are,

- ▶ Radio
- ▶ Baseband
- ▶ Link Manager Protocol

- Logical Link control and adaptation protocol
- Service discovery protocol.

23. What are the advantages and disadvantages of FHSS? (Dec 2009)

Advantages

- frequency selective fading and interference limited to short period
- simple implementation
- uses only small portion of spectrum at any time

Disadvantages

- not as robust as DSSS
- simpler to detect

24) What are the categories of Mobile services?

- Bearer services
- Tele services
- Supplementary services

25) What are the services provided by supplementary services?

- User identification
- Call redirection
- Call forwarding
- Closed user groups
- Multiparty Communication

26) What are the four types of handover available in GSM?

1. Intracell Handover
2. Intercell Intra BSC Handover
3. Inter BSC Intra MSC handover
4. Inter MSC Handover

27). What is meant by GPRS?

The General Packet Radio Service provides packet mode transfer for applications that exhibit traffic patterns such as frequent transmission of small volumes.

28) What are subsystems in GSM system?

- Radio subsystem(RSS)
- Network & Switching subsystem(NSS)
- Operation subsystem(OSS)

29) What are the information in SIM?

- card type, serial no, list of subscribed services
- Personal Identity Number(PIN)
- Pin Unlocking Key(PUK)
- An Authentication Key (KI)

30) Define Normal Burst?

The frame used for normal data transmission with in a time slot is called Normal Burst.

31) What are the logical channels in GSM?

- Traffic channel (TCH)
- Control channel (CCH)

32) what is meant by beacon?

A beacon contains a timestamp and other management information used for power management and roaming.

e.g., identification of the base station subsystem(BSS)

33).What are the reasons for delays in GSM for packet data traffic.

1. Different data rates provided by traffic channels are low.

2. Authentication and encryption also makes the packet data transmission low.
3. Various interferences and noises from the channel also causes delay.

34).List out disadvantages of cellular system.

1. Self-jamming
2. Near-far problem
3. Soft Handoff

35).How much of the original GSM network does GPRS need. Which elements of the network perform the data transfer.

GPRS is an enhancement of SM. It uses same physical channel as GSM and only new logical GPRS radio channels are defined.

Elements needed for data transfer:

1. GPRS support nodes(GSN)
2. Gateway GPRS Support Node(GGSN)
3. Servicing GPRS Support Node(SGSN)
4. GPRS Register(GR)

36).Explain the various entities available in radio subsystem

1. BSS: It performs all function necessary to maintain radio connections to a MS.
2. BTS: It comprises all radio equipments
3. BSC: It basically manages BTSs.
4. MS: It comprises all user equipment and software needed for communication with in a GSM network.

37). Explain the various entities available in NSS. NSS consist of following switches and databases.

1. MSC: They setup connection to other MSCs and to BSCs via A interface.
2. HLR: It is the most important database which stores all user relevant information.
3. VLR: It is a dynamic database which stores all important information needed for MS Users currently in the that is associated to MSC.

38). Explain the various systems available in Operation Subsystem.

Operating sub system: It contains necessary functions for network operation and maintenance.

1. OMC: It manages traffic monitoring, accounting and billing
2. AuC : It is used to protect user identity and data transmission.
3. EIR : Its to res all device identifications registered for this network.

39). Explain the various control channels available in GSM.

1. BCCH: ABTS uses this channel to signal information to all MSs with in a cell.
2. CCCH: All information regarding connection setup between MS and BS are exchanged via CCCH.
3. DCCH: It is used to exchange large amounts of data in less time.

40). What is mobile routing?

Even if the location of a term in alis known to the system, its till has to route the traffic through the network to the access point currently responsible for the wireless terminal.

41). What are the functions which support service and connection control?

- ▶ Access point control function
- ▶ Call control and connection Control function
- ▶ Network security agent
- ▶ Service control function
- ▶ Mobility management function

42). **If 8 speech channels are supported on a single radio channel, and it no guard band is assumed, what is the number of simultaneous users can be accommodated in GSM?**

A time slot in GSM can only be used by one user to transmit it or receive during one of the transmission (radio) channels. That is, we can accommodate 1 user in one time slot.

Therefore, for 8 speech channels we can accommodate 8 simultaneous users in GSM.

43) Define Base Station Subsystem GPRS protocol (BSSGP).

The Base Station Subsystem GPRS protocol (BSSGP) is used to convey routing and QoS-related information between the BSS and SGSN. BSSGP does not perform error correction and works on top of a Frame Relay (FR) network.

UNIT II

1. What are the basic elements of telecommunication systems?

Transmitter—it takes the information and converts it into a signal

Transmission medium—it carries the signal

Receiver—receives the signal and converts it back into usable information.

2. What are the major subsystems in GSM?

GSM consists of three major components

- ▶ Base station subsystem
- ▶ Network and switching subsystem
- ▶ Operation support subsystem

3. List the databases of NSS in GSM?

- ▶ Home location register
- ▶ Visitor location register
- ▶ Authentication center

4. What are the functions of OSS in GSM?

- ▶ Manage all charging and billing procedures
- ▶ Manage all mobile equipment in the system

5. Write the interfaces used in GSM

There are three interfaces used in GSM, they are

- ▶ GSM radio air interface
- ▶ Abis interface
- ▶ A interface

6. What are the services offered by the GSM?

There are three user services offered by GSM, they are

- ▶ Bearer or data service
- ▶ Telephone service
- ▶ Supplementary ISDN service

7. List the security services offered by GSM?

- ▶ Access Control and Authentication
- ▶ Confidentiality
- ▶ Anonymity

8. Define the protocol architecture of DECT.

The protocol architecture of DECT consists of three layers. They are:

- ▶ Physical Layer.
- ▶ Medium Access Layer.
- ▶ DataLink Control Layer.
- ▶ Network Layer.

The first three layers are common for both Control Plane (C-Plane) and User Plane (U-Plane). The network layer has been specified only for U-Plane, so that user data from layer two is directly forwarded to the U-Plane.

9. What is meant by GGSN?

GGSN is Gateway GPRS Support Node. It is the inter-working unit between the GPRS network and external packet data networks. The GGSN is connected to external networks via the Gi interface and transfers packets to the SGS Nviaan IP-based GPRS backbone net work.

10. What is meant by BSSGP?

BSSGP is Base Station Subsystem GPRS Protocol. It is used to convey routing And QoS-related information between the BSS and SGSN.BSSGP does not perform error correction and works on top of a frame relay network.

11. What are the four possible handover scenarios in GSM?

The four possible hand over scenarios in GSM are:

- ▶ Intra-cell handover.
- ▶ Inter-cell, intra-BSC handover.
- ▶ Inter-BSC, intra-MSC handover.
- ▶ Inter MSC handover.

12. List out the numbers needed to locate an MS and to address the MS.

The numbers needed to locate an MS and to address the MS are:

- ▶ Mobile station international ISDN number(MSISDN).
- ▶ International mobile subscriber identity(IMSI).
- ▶ Temporary mobile subscriber identity(TMSI).
- ▶ Mobile station roaming number(MSRN).

13. Write the application of satellite network?

- ▶ Weather forecasting
- ▶ Radio and TV broadcast satellite
- ▶ Military satellite
- ▶ Satellites for navigation

14. Define elevation angle?

The Elevation angle is the angle from the horizontal to the point on the center of the main beam of the antenna when the antenna is pointed directly at the satellite.

15. What are the advantages GEO?

Three GEO satellites are enough for a complete coverage of almost any spot on earth. Senders and receivers can use fixed antenna positions, no adjusting is needed. Therefore GEO are ideal for TV and radio broadcasting

16. List the advantages of MEO?

Using orbits around10,000km, the system only requires a dozen satellites which is more than a GEO system, but much less than a LEO system. Furthermore these satellites move slower relative to the earth's rotation allowing simpler system design.

17. What are the types of transport mechanism used in DAB?

The two basic transport mechanisms used by DAB are:

- ▶ Main Service Channel(MSC).
- ▶ Fast Information Channel (FIC).

18. What are the factors limited the number of sub channels provided with in the satellite channel?

There are three factors limited the number of sub channels provided with in the satellite channel. They are:-

Thermal Noise.

- ▶ Inter modulation Noise.
- ▶ Crosstalk.

19. What is the frequency range of uplink and downlink in GSM network?

The frequency range of uplink in GSM network is 890-960 MHz. The frequency range of downlink in GSM network is 935-960 MHz.

20. What are the two basic groups of logical channels in GSM?

The two basic groups of logical channels in GSM are:

- ▶ Traffic channels (TCH).
- ▶ Control Channels (CCH).

21. What are the different phases in HIPERLAN?

The different phases in HIPERLAN are

1. Prioritization phase
2. Contention phase, and
3. Transmission phase.

22. What is scatternet?

One Bluetooth device can operate simultaneously on two piconets, acting as a bridge between the two. A Conglomeration of two or more piconets is called a scatternet.

What are the elements of Bluetooth core protocols?

The elements of Bluetooth core protocols are

- ▶ Radio.
- ▶ Baseband,
- ▶ .Link manager protocols,
- ▶ Logical link control & adaptation protocol(L2CAP)
- ▶ Survive discovery protocol.

23. List the two types of data bursts specified by HIPERLAN.

The two types of data bursts specified by HIPERLAN are,

- LBR–HBR data burst
- LBR data burst.

24. What are the general extension of ATM.

1. Location Management
2. Mobile Routing
3. Handover Signalling
4. Qos and traffic Control
5. Network Management

25. Example for WATM.

1. Office Environment
2. Universities, schools, training centers
3. Industry
4. Hospitals
5. Home
6. Networked vehicles etc.

26. What are the four possible handover scenarios in GSM? (Nov/Dec -2011)

- ▶ Intra-cell handover.
- ▶ Inter-cell, intra-BSC handover.
- ▶ Inter-BSC, intra-MSC handover.
- ▶ Inter MSC handover.

**27. Outline the Demand Assigned Multiple Access(DAMA)with explicit reservation?
(Nov/Dec -2011)**

DAMA is an **explicit reservation** scheme. Each transmission slot has to be Reserved explicitly. One basic scheme is demand assigned multiple access (DAMA) also called reservation Aloha, a scheme typical for satellite systems.

UNIT -III

1. What are the advantages of WLAN?

- High flexibility
- Simple Design
- Easy planning
- Low cost

2. What are the benefits of using infrared for transmission?

- It is simple and extremely cheap senders and receivers
- It defines higher data rates
- The electrical devices do not interfere with the infrared transmission

3. What are adhoc networks?

Adhoc networks do not need any infrastructure to work and each node can communicate with other nodes directly, so that the access point controlling medium is not necessary.

4. What are the disadvantages of WLAN?

- Lower quality of service
- Slow standardization procedures
- Frequency restriction
- Less safety and security.

5. What is IEEE802.11 standard?

The IEEE 802.11 standard specifies the physical and medium access layer adapted to the special requirements of wireless LANs. This standard offers the time bounded and asynchronous services. The data rate of this standard is 54 M bits/s at 5 GHz.

6. What is ESS and ESSID?

A distribution system is used to connect a several BSS via the access point to form a single network and there by extends the wireless coverage area. This network is called extended service set and it has own identifier is called ESS ID. The ESS ID is used to separate different networks.

7. How the physical layer is subdivided inIEEE802.11standard?

The physical layer is subdivided into two parts.

- Physical layer convergence protocol.
- Physical medium dependent sublayer 8.

What are the functions of MAC management?

- Supports the association and re association of a station to an access point and roaming between different access points.
- It maintains the MAC information base(MIB)
- It also controls the authentication mechanisms, encryption, power management

9. Define SIFS and PIFS.

The shortest waiting time for medium access is called the short inter frame spacing. For DSSS the SIFS is 10 micro sec and for FHSS is 8 micros sec. The waiting time between DCF inter frame spacing and SIFS is called PCF inter frame spacing.

10. What are the services provided by the MAC layer?

- Asynchronous data service
- Time bounded services

11. Define HIPERLAN.

HIPERLAN means high performance local area network. The ETSI standardized HIPERLAN1asaWLANallowing for node mobility and supporting infrastructure based adhoc

topologies. It includes topology discovery, forwarding mechanism, user data encryption, power conservation mechanism.

12. List the phases in EY-NPMA.

The heart of channel access providing priorities is elimination yield non preemptive priority multiple access. It divides the medium access of different competing nodes into three phases.

- Prioritization phase
- Contention phase
- Transmission phase

13. What are the different channels used in HIPERLAN2?

- Broadcast channel
- Long transport channel
- Random channel
- Access feedback channel
- Short transport channel
- Frame channel

14. What are the features of HIPERLAN2?

- High throughput transmission
- Connection oriented
- Security support
- Quality of service support

15. What are the functions of link manager protocol?

- Authentication, paging and encryption
- Capability negotiation
- Power control
- Synchronization
- Link supervision

16. What is Bluetooth?

The Bluetooth technology also called as adhoc piconets. It is a local area network with over limited coverage and does not need for an infrastructure. It is used to connect different small devices in close proximity about 10m without the use of wiring or the need for wireless infrastructure.

17. What are the advantages of Bluetooth technology?

- Bluetooth provides arrange of about 100 meters
- It is also low power and low processing with an overhead protocol
- The application with the Bluetooth are virtually endless.

18. Write some WATM service?

WATM is mainly designed for transferring voice, classical data, video, multimedia

data.

- Office environment
- Universities, schools
- Hospital
- Industries.

19. Differentiate p-scanners and p-supporters.

In HIPERLAN a node may have a specific wake up pattern. His pattern determines at what time the node is read to receive, so that other times, the node can turn off its receiver and save the energy. The set types of nodes are called p-savers. The information about the wake-up patterns of all the p savers are in p supporters. When the saver is awake, it forwards the data to ap saver.

20. What is scatternet?

Group of piconets are called as scatternets. A scatternet may have two piconets, in which one device participates in two different piconets.

UNIT IV

1. What is a socket?

A TCP connection can be identified by the tuple such as source IP address, source port, destination IP address, destination port also known as socket. Therefore, a TCP connection cannot survive any address change.

2. What are the requirements of Mobile IP?

- Compatibility
- Transparency
- Scalability and Efficiency
- Security

3. Define COA.

A COA defines the current location of the MN from an IP point of view. All IP packets sent to the MN are delivered to the COA, not directly to the IP address of the MN. Packet delivery toward the MN is done using a tunnel.

4. What is Co-located COA?

A COA is called co-located if the Mobile Node temporarily acquired an additional IP address which acts as a COA. This address is now topologically correct, and the tunnel endpoint is at the mobile node.

5. What is encapsulation and decapsulation?

Encapsulation is the mechanism of taking a packet consisting of packet header and data and putting it into the data part of an ew packet. The reverse operation, taking a packet out of the data part of another packet, is called decapsulation.

6. What is the purpose of GRE?

GRE allows the encapsulation of packets of one protocol suite into the payload portion of a packet of an other protocol suite. The packet of one protocol suite with the original packet header and data is taken and a new GRE header is prepended. Together this forms the new data part of the new packet.

7. What do you mean by binding request?

Any node that wants to know the current location of the mobile node can send a binding request to the home agent/ the home agent can check if the MN has allowed dissemination of its current location. If the HA is allowed to reveal the location it sends back a binding update.

8. List the advantages of using Adhoc networks?

- Instant Infrastructure
- Disaster Relief
- Dynamic Topology

9. What are the enhancements made in DSDV?

DSDV adds to things to the Distance vector algorithm,

- Sequence Number
- Damping

10. What is Route Maintenance?

If a node is continuously sending packets via a route. It has to make sure that the route is held upright. As soon as a node detects problems with the current route, it has to find an alternate route.

11. What is route discovery?

A node only tries to discover a route to a destination of it has to send something to this

destination and there is currently no known route. If a node needs to discover a route, it broadcasts a route request with a unique identifier and the destination address as parameters.

12. What is the purpose of DHCPREQUEST?

When the client sends a DHCP discover message the server responds with the DHCP offer message and offers a list of configuration parameters. Now the client can choose among One of the offered configurations and rejecting the others using DHCPREQUEST.

13. What should be done to optimize the route discovery?

- Too many broadcasts can be avoided by maintaining a counter.
- A node can cache path fragments from recent requests.
- A node can also update this cache from packet headers.

14. What are the metrics should be considered while routing?

- Number of hops
- Interference
- Reliability and
- Error rate

All these above metrics should be minimum.

15. What is binding warning?

If a node decapsulates a packet for an MN, but it is not the current FA for this MN, this node sends a binding warning to the HA of the MN. The warning contains the Ip address of the MN and the address of the node that has tried to send the packet to this MN. The HA should now send binding update to the node that obviously has a wrong COA for the MN.

16. What is the main purpose of registration request in mobile IP?

The main purpose of registration is to inform the HA of the current location for correct forwarding of packets. Registration is done by mobility binding

17. What do you mean by mobility binding?

The MN sends its registration request containing the COA to the FA which is forwarding the request to the HA. The HA now sets up a mobility binding containing the mobile node's home IP address and the current COA.

18. What are the services provided by the foreign agent?

The FA can provide several services to the MN during its visit in the foreign network. The FA can have the COA thus acting as tunnel endpoint and forwarding packets to the MN. Further more the FA can be a default router for the MN. The FA can also provide security services.

19. What is Foreign agent COA?

The COA could be located at the FA, ie., the COA is an IP address of the FA. Thus the FA is the tunnel end point and forwards packets to the MN many MN using the FA can share this COA as common COA.

20. What does recursion control field represent?

It is an import field that distinguished GRE from IP-in-IP and minimal encapsulation. This field represents a counter that's hows the number of allowed recursive encapsulations.

UNIT V

1. What is the importance for congestion threshold?

Congestion widow gets doubled each time when there is a proper acknowledgement. It is too dangerous to double the congestion window each time because the steps might become too large. Therefore, the exponential growth of the congestion window has to be stopped by using the congestion threshold. As soon as the congestion window reaches the congestion threshold, further increase of transmission rate is only linear by adding1 to the congestion window each time.

2. What is indirect TCP?

Indirect TCP is used to segment a TCP connection into a fixed part and a wireless part. Between the fixed computer and the access point standard TCP is used. Thus, no computer in the internet recognizes any changes to TCP the access point is now seen as the mobile host for the fixed host and as a fixed host for the mobile host.

3. What are the advantages of snooping TCP?

Prevention of End to end TCP semantic. No Correspondent Node needs to be changed; most of the enhancements are in the foreign agent.

4. Defines low start?

In TCP, missing acknowledgement is quite drastic, but it is necessary to get rid of congestion quickly. The behavior of TCP shows after the detection of congestion is called slow start.

5. What is fast retransmit?

The gap in the packet stream is not due to the severe congestion it is also due to the Transmission error. The sender can now retransmit the missing packet before the timer expires. This behavior is called fast retransmit.

6. What are the disadvantages of I-TCP?

- a. The loss of the end to end semantics of TCP might cause problems if the FA partitioning the TCP connection crashes.
- b. The hand over latency increases. This may cause more problems.

7. Define persistent mode.

The state of the sender will not change no matter how long the receiver is disconnected. This is called persistent mode.

8. List the interfaces used in WAP architecture

- a. Transport layer service access point
- b. Security service access point
- c. Transaction service access point
- d. Application service access point

9. What is the use of WAE?

The application layer with the Wireless Application Environment (WAE) offers a framework for the integration of different www and mobile telephony application.

10. What are the benefits of using WTP?

It offers several advantages to higher layers, including an improved reliability over datagram services, improved efficiency over connection oriented service, and support for transaction oriented services such as web browsing.

11. How does the WTP achieves reliability?

The reliability can be achieved by duplicate removal, retransmission, acknowledgements and unique transaction identifiers.

12. What are the features of WSP?

- a. Session management
- b. Capability management
- c. Content management

13. List the basic features of WML?

The WML includes several basic features such as

- **Text and images**
- **User interaction**
- **Navigation**
- **Context management**

14. What is WDP?

The wireless datagram protocol operates on top of many different bearer services capable of carrying data. The WDP offers more or less the same services as the UDP. In order to multiplexing and de multiplexing of data the WDP offers a source and destination port numbers.

15. What is WTA?

The wireless telephony application is a collection of telephony specific extension for call and feature control mechanisms, merging data networks and voice networks.

16. What is WAP 2.0?

The WAP 2.0 continues to support WAP 1.x protocols but it additionally integrates IP, TCP, TLS and HTTP. It supports WML as well as XHTML with a mobile profile.

17. What are the benefits of using WAP?

- Interoperable
- Scalable
- Efficient

18. What is the use of WCMP?

The wireless control message protocol is used to provide the error handling mechanism for WDP. It contains control messages that resemble the ICMP messages for IPV4. it can be used for WDP nodes and gateways.

19. What is WTLS?

The Wireless transport layer security can provide different level so security i.e., privacy, data integrity, and authentication and it has been optimized for low band width, high delay be are networks. It supports data gram and connection oriented transport layer protocols.

20. Define snooping TCP.

The FA buffers all packets with destination mobile host and additionally snoops the packet flow in both directions to recognize acknowledgements is called snooping TCP.