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DEPARTMENT OF COMPUTER SCIENCE

QUESTION BANK

CLASS	:	**M.SC., COMPUTER SCIENCE**
YEAR	:	**I**
SEMESTER	:	**II**
TITLE OF THE PAPER	:	**MOBILE COMMUNICATIONS**
SUBJECT CODE	:	**P16CSE1A**
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UNIT – I
INTRODUCTION TO MOBILE COMMUNICATIONS
ONE MARK

1. **The multiplexing technique, in which each input connection has an allotment in the output even if it is not sending data is**

| A | Asynchronous TDM | B | Synchronous TDM |
| C | FDM | D | WDM |

Ans: B. Synchronous TDM

2. **Spread-spectrum can be done by using:**

| A | computer-controlled frequency reuse | B | frequency-hopping |
| C | direct-sequence method | D | all of the above |

Ans: D. all of the above

3. **In multiplexing, channels are separated by unused strips of bandwidth guard bands - to prevent**

| A | Synchronization | B | Overlapping |
| C | random motion of electrons | D | Both B & C |

Ans: Overlapping

4. **Which of the following measures spectrum efficiency of a wireless system?**

| A | a) Channel capacity | B | Radio capacity |
| C | b) Radio capacity | D | Carrier capacity |

Ans: B. Radio capacity

5. **Why spread spectrum technique is inefficient for a single user?**

| A | Large transmission bandwidth | B | Small transmission bandwidth |
| C | Fixed transmission bandwidth | D | Fixed null bandwidth |

Ans: A. Large transmission bandwidth

6. **In Frequency Hopping Spread Spectrum (FHSS), the sender and receiver can have privacy if the hopping period is**

| A | Long | B | short |
| C | Zero | D | infinity |

Ans: B. Short

7. **Advantages of Cellular System**

| A | Frequency planning | B | Handover |
| C | Robustness | D | Infrastructure |

Ans: C. Robustness

8. **In Pure ALOHA, the vulnerable time is _____ the frame transmission time.**

| A | The Same as | B | Two times |
| C | Three Times | D | None Of these |

Ans: B. Two Times

9. **_____ requires that each station first listen to the medium before sending.**

| A | MA | B | CSMA |
| C | CDMA | D | FDMA |

Ans: B. CSMA

10. **In the _____ method, a station needs to make a reservation before sending data. Time is divided into intervals**

| A | Reservation | B | Polling |
| C | Token Passing | D | None of these above |

Ans: A. Reservation

UNIT – II
TELECOMMUNICATION SYSTEM
ONE MARK

1. **Which of the following is the world's first cellular system to specify digital modulation and network level architecture?**

A	GSM	B	AMPS
C	CDMA	D	IS -54

Ans: **A. GSM**

2. **____ manages the switching function in GSM.**

A	BSS	B	OSS
C	MSC	D	NSS

Ans: **D. NSS**

3. **The Mobile Switching Center (MSC) transmits the ringing signals, once the mobile station is**

A	Available	B	Arranged
C	Optimized	D	Found

Ans: **D. Found**

4. **The mobile station moves from one cell to another during a**

A	Conversation	B	Optimization
C	Connection	D	Stations

Ans: **A. Conversation**

5. **UMTS uses which multiple access technique?**

A	CDMA	B	FDMA
C	TDMA	D	SDMA

Ans: **A. CDMA**

6. **What is the chip rate of W-CDMA?**

A	1.2288 Mcps	B	270.833 Ksps
C	3.84 Mcps	D	d) 100 Mcps

Ans: **A. 1.2288Mcps**

7. **WCDMA stands for?**

A	Wide array CDMA	B	Wide band CDMA
C	Wireless CDMA	D	Wifi CDMA

Ans **B. Wide band CDMA**

8. **What is the name of BSC equivalent part in a 3G mobile network?**

A	Controller	B	Radio Switch Controller
C	Radio Network Controller	D	Radio Command Center

Ans: **C. Radio Network Controller**

9. **What type handover are possible when moving from one cell to other cell?**

A	Hard Handover	B	Soft Handover
C	Hybrid Handover	D	None

Ans: **B. Soft Handover**

10. **The smallest beam of a satellite antenna radiation pattern is _____**

A	Zone Beam	B	Hmeispheric Beam
C	Spot Beam	D	Global Beam

Ans: **C. Spot Beam**

UNIT – III
WIRELESS LAN
ONE MARK

1. Which of the following spread spectrum techniques were used in the original IEEE 802.11 standard?

A FHSS and DSSS   B THSS and FHSS
C THSS and DSSS   D Hybrid Technique

Ans: A. FHSS and DSSS

2. DCF stands for

A Direct Control Function   B Direct Cooperate Function
C Distributed Control Function   D Distributed Coordination Function

Ans: D. Distributed Coordination Function

3. An interconnected collection of piconet is called _____

A Scatternet   B micronet
C Mininet   D multinet

Ans: A. Scatternet

4. Bluetooth uses _____

A Frequency hopping spread spectrum   B Time division multiplexing
C Orthogonal frequency division multiplexing   D Channel division multiplexing

Ans: A. Frequency hopping spread spectrum

5. Bluetooth has used a sophisticated version of

A CSK   B FSK
C TDMA   D CDMA

Ans: B. FSK

6. In Bluetooth, the L2CAP the LLC sublayer in LANs

A Radio   B Baseband
C L2CAP   D None of the Above

Ans: C. L2CAP

7. In Bluetooth, the _____ link is used when data integrity is more important than avoiding latency.

A SCO   B ACL
C ACO   D SCL

Ans: A. SCO

8. In the _____ method, all data exchanges must be made through the primary device even when the ultimate destination is a secondary device.

A Reservation   B Polling
C Token Passing   D None of the above

Ans: B. Polling

9. In Frequency Division Multiple Access (FDMA), each band is reserved for a specific

A Station   B Signal
C Bandwidth   D Data

Ans: A. Station

10. A station that is assigned a shorter Interframe Space (SIFS) has a

A Low Priority   B Idle State
C High Priority   D No Priority

Ans: C. High Priority

UNIT – IV
MOBILE IP
ONE MARK

1. Expansion of MN

A	Mobile Network	B	Mobile Node
C	Mobility Node	D	None of above these

Ans: B. Mobile Node

2. Tunneling is a strategy used when two computers are using.

A	IPv4	B	IPv6
C	IPv5	D	None of the Above

Ans: B. IPv6

3. Which one is the permanent IP address assigned to the mobile node

A	Home Address	B	Home Network
C	Home Agent	D	None of above these

Ans: A. Home Address

4. Which one is the temporary address used by a mobile node while it is moving away from its home network

A	CN	B	COA
C	HA	D	FA

Ans: B. COA

5. The processes that keep track of all mobile hosts visiting the area is ....

A	Home Agent	B	Home Network
C	User Agent	D	Foreign Agent

Ans: D. Foreign Agent

6. What is the type of network in which the routers themselves are mobile?

A	Mobile Ad hoc Network	B	Wide Area Network
C	Mobile Network	D	Local Area Network

Ans: A. Mobile Ad hoc Network

7. What is the routing algorithm used in MANETs?

A	Shortest Path First	B	Routing Information Protocol
C	Distance Vector Protocol	D	Ad hoc On-demand Distance Vector Protocol

Ans: D. Ad hoc On -demand Distance Vector Protocol

8. The hosts who compute on the run and want to maintain their connections as they move around ....

A	Migratory hosts	B	Stationary hosts
C	Mobile hosts	D	Random hosts

Ans: C. Mobile hosts

9. What is the type of network in which the routers themselves are mobile?

A	WAN	B	Mobile Network
C	Mobile Ad Hoc Network	D	LAN

Ans: C. Mobile Ad Hoc Network

10. Expansion of SPANC

A	Smart Phone Ad hoc Network	B	Small Phone Ad hoc Network
C	Short Phone Ad hoc Network	D	Slot Phone Ad hoc Network

Ans: A. Smart Phone Ad Hoc Network

UNIT – V
WIRELESS APPLICATION PROTOCOL
ONE MARK

1. WAP Stands for

A Wired Application Protocol | B Wireless Application Protocol
C Wired Applied Protocol | D None of these Above

Ans: B. Wireless Application Protocol

2. WTP allows

A Asynchronous transactions | B transaction identifiers
C Acknowledgements | D Duplicate removal

Ans: A. Asynchronous transactions

3. WTP achieves

A Asynchronous transactions | B Duplicate removal
C Acknowledgements | D unique transaction identifiers

Ans: **C. Unique transaction identifiers**

4. How many classes of transaction services in WTP

A 1 | B 2
C 4 | D 3

Ans: D. 3

5. Who offers an unreliable transaction service without a result message

A Class 0 | B Class 1
C Class 2 | D None Of these above

Ans: A. Class 0

6. Who offers an reliable transaction service without a result message

A Class 0 | B Class 1
C Class 2 | D None Of these above

Ans: B. Class 1

7. _____ has been designed to operate on top of the datagram service WDP

A WAP | B WTP
C WSP | D None of these above

Ans: C. WSP

8. SPID Expands

A Smart Pop Identifier | B Server Push Identifier
C Server Pop Identifier | D None of these above

Ans: B. Server Push Identifier

9. CPID Expands

A Client Pop Identifier | A Care of Address Pop Identifier
C Client Push Identifier | C None of these above

Ans: C. Server Push Identifier

10. Wireless Markup Language is not supported features

A Text and images | B Extensions to the device software
C Context management | D None of these above

Ans: B. Extension to the device software

UNIT – I
INTRODUCTION OF MOBILE COMMUNICATION
TWO MARKS

1. Define Infra red.

Ans: Infra red(IR) transmission is used for directed links, e.g., to connect different buildings via laser links.

2. Define signals.

Ans:
- Signals are the physical representation of data.
- Signals are functions of time and location.
- Signal parameters represent the data values.

3. Define antennas.

Ans: A theoretical reference antenna is the isotropic radiator, a point in space radiating equal power in all directions, i.e., all points with equal power are located on a sphere with the antenna as it's center.

4. Define multi-path propagation.

Ans: Together with the direct transmission from a sender to a receiver, the propagation effects mentioned in the previous section lead to one of most severe radio channel impairments, called multi-path propagation.

5. Define multiplexing.

Ans:
- Multiplexing is not only a fundamental mechanism in communication systems but also in everyday life.
- Multiplexing describes how several users can share medium with minimum or no interference.

6. List out of the multiplexing.

Ans:
- Space division multiplexing
- Frequency division multiplexing
- Time division multiplexing
- Code division multiplexing

7. Define spread spectrum.

Ans: Spread spectrum techniques involve spreading the bandwidth needed to transmit data- which does not make sense at first sight. Spreading the bandwidth has several advantages.

8. Define cellular systems.

Ans: Cellular systems for mobile communications implement SDM. Each transmitter, typically called a base station, covers a certain area, a cell.

9. Define FDM.

Ans: Frequency division multiplexing (FDM) describes schemes to subdivide the frequency into several non-overlapping frequency bands.

10. List down the applications of Mobile Communications.

Ans: Vehicles, Emergencies, Business, Replacement of wired networks, Infotainment, Location dependent services, Mobile and wireless devices.

UNIT – II
TELECOMMUNICATION SYSTEM
TWO MARKS

1. **Define GSM**

Ans: GSM is global system for mobile communication. It is the most successful digital mobile telecommunications system in the world today. It's used by over 800 million people in more than 190 countries.

2. **Define system architecture of GSM**

Ans: As with all systems in the telecommunications area, GSM comes with hierarchical, complex system architecture comprising many entities, interfaces and acronyms.

3. **List out of the mobile services.**

Ans:
- Bearer services
- Tele services
- Supplementary services

4. **Define NSS.**

Ans: The "heart" of the GSM system is formed by the network and switching subsystem (NSS). The NSS connect the wireless network with standard public networks.

5. **Define operating subsystem.**

Ans: The third party of a GSM system, the operating subsystem (OSS), contains the necessary functions for network operations and maintenance. The OSS possesses network entities of its own and accesses other entities via SS7 signaling.

6. **Define handover.**

Ans: Cellular systems require handover procedures, as single cells do not cover the whole service area, but e.g., only up to 35km around each antenna on the countryside and some hundred metres in cities.

7. **List out of the handover scenarios in GSM.**

Four types of handover scenarios in GSM.

Ans:
- Inter-cell handover
- Inter-cell, inter-BSC handover
- Inter-BSC-Inter-MSC handover
- Inter MSC handover

8. **Define security.**

Ans: GSM offers several security services using confidential information stored in the AuC and in the individual SIM. The SIM stores personal secret data and is protected with a PIN against unauthorized use.

9. **Define GPRS.**

Ans: The general packet radio service provides packet mode transfer for applications that exhibit traffic patterns such as frequent transmission of small volumes (e.g., typically web requests) or infrequent transmissions of small or medium volumes (e.g., typical web responses) according to the requirements specification.

10. **Define UTRAN.**

Ans: The basic architecture of the UTRA network (UTRAN; 3GPP,2002b). This consists of several radio networks subsystem (RNS).

UNIT – III
WIRELESS LAN
TWO MARKS

1. Define ad-hoc network.

Ans: In ad-hoc networks, the complexity of each node is higher because every node has to implement medium access mechanisms, mechanisms to handle hidden or exposed terminal problems, and perhaps priority mechanisms, to provide a certain quality of service.

2. Define IEEE 802.11.

Ans: The IEEE standard 802.11 (IEEE, 1999) specifies the most famous family of WLANs in which many products are available. As the standard's number indicates, this standard belongs to the group of 802.x LAN standards, e.g., 802.3 Ethernet or 802.5 Token Ring.

3. Define physical layer.

Ans: IEEE 802.11 supports three different physical layers: one layer based on infra red and two layers based on radio transmission (primarily in the ISM band at 2.4 GHz, which is available worldwide). All PHY variants include the provision of the clear channel assessment signal (CCA).

4. Define MAC management.

Ans: MAC management plays a central role in an IEEE 802.11 station as it more or less controls all functions related to system integration, i.e., integration of a wireless station into a BSS, formation of an ESS, synchronization of stations etc.

5. Define power management.

Ans: Power management in infrastructure-based networks is much simpler compared to ad-hoc networks. The access point buffers all frames destined for stations operating in power-save mode. With every beacon sent by the access point, a traffic indication map (TIM) is transmitted.

6. Define HIPERLAN.

Ans: In 1996, the ETSI standardized HIPERLAN 1 as a WLAN allowing for node mobility and supporting ad-hoc and infrastructure-based topologies (ETSI,1996). (HIPERLAN stands for high performance local area network.) HIPERLAN 1 was originally one out of four HIPERLANs envisaged, as ETSI decided to have different types of networks for different purposes.

7. Define Bluetooth.

Ans: Compared to the WLAN technologies presented in sections 7.3 and 7.4, the Bluetooth technology discussed here aims at so-called ad-hoc piconents, which are local area networks with a very limited coverage and without the need for an infrastructure.

8. Define networking.

Ans: To understand the networking of Bluetooth devices a quick introduction to its key features is necessary. Bluetooth operates on 79 channels in the 2.4 GHz band with 1 MHz carrier spacing.

9. Define LMP.

Ans: The 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.

10. Define profiles.

Ans: Profiles represent default solutions for a certain usage model. They use a selection of protocols and parameter set to form a basis for interoperability. Protocols can be seen as horizontal layers while profiles are vertical slices.

11. Define security.

Ans: The main security features offered by Bluetooth include a challenge response routine for authentication, a stream cipher for encryption, and a session key generation. Each connection may require a one-way, two-way, or no authentication using the challenge-response routine.

UNIT – IV
MOBILE IP
TWO MARKS

1. Define registration.

Ans: Having received a COA, the MN has to register with the HA. The main purpose of the registration is to inform the HA of the current location for correct forwarding of packets. Registration can be done in two different ways depending on the location of the COA.

2. Define tunneling.

Ans: A tunnel establishes a virtual pipe for data packets between a tunnel entry and a tunnel endpoint. Packets entering a tunnel are forwarded inside the tunnel and leave the tunnel unchanged.
Tunneling, i.e., sending a packet through a tunnel is achieved by using encapsulation.

3. Define encapsulation.

Ans: Encapsulation is the mechanism of taking a packet consisting of packet header and data and putting it into the data part of a new packet. The reverse operation, taking a packet out of the data part of another packet, is called encapsulation.

4. Types of encapsulation.

Ans:
- IP-in-IP encapsulation
- Minimal encapsulation
- Generic routing encapsulation

5. Define Hawaii.

Ans: HAWAII (Handoff-Aware Wireless Access Internet Infrastructure, Ramjee, 1999)tries to keep micro-mobility support as transparent as possible for both home agents and mobile nodes (which have to support route optimization). Its concrete goals are performance and reliability improvements and support for quality of service mechanisms.

6. What is meant by routing?

Ans: While in wireless networks with infrastructure support a base station always reaches all mobile nodes, this is not always the case in an ad-hoc network. A destination node might be out of range of a source node transmitting packets. Routing is needed to find a path between source and destination and to forward the packets appropriately.

7. Define cellular IP.

Ans: Cellular IP (Valko, 1999), (Campbell, 2000) provides local handovers without renewed registration by installing a single cellular IP gateway (CIPGW) for each domain, which acts to the outside world as a foreign agent.

8. Define minimal encapsulation.

Ans: As seen with IP-in-IP encapsulation, several fields are redundant. For example, TOS is just copied, fragmentation is often not needed etc. Therefore, minimal encapsulation.

9. Write about advantages in Hierarchical mobile IPv6 (HMIPv6)?

Ans: Security: MNs can have (limited) location privacy because LCOAs can be hidden.
Efficiency: Direct routing between CNs sharing the same link is possible.

10. Define DSDV.

Ans: Destination sequence distance vector (DSDV) routing is an enhancement to distance vector routing for ad-hoc networks (Perkins, 1994).
DSDV can be considered historically, however, an on-demand version (ad-hoc on-demand distance vector, AODV) is among the protocols currently discussed.

11. Define Flat ad-hoc routing.

Ans: Flat ad-hoc routing protocols comprise those protocols that do not set up hierarchies with clusters of nodes, special nodes acting as the head of a cluster, or different routing algorithms inside or outside certain regions. All nodes in this approach play an equal role in routing.

WIRELESS APPLICATION PROTOCOL
TWO MARKS

1.   Define coda.

Ans: The predecessor of many distributed file systems that can be used for mobile operation is the Andrew file system (AFS, (Howard, 1988)). Coda is the successor of AFS and offers two different types of replication: server replication and caching on clients.

2.   Define WWW.

Ans: This section discusses some problems that web applications encounter when used in a mobile and wireless environment. The reader should be familiar with the basic concepts of the world wide web, its protocols (HTTP) and language (HTML).

3.   Define HTML.

Ans: HTML is broadly used to describe the content of web pages in the World Wide Web (Raggett, 1998). No matter which version is used, they all share common properties: HTML was designed for standard desktop computers connected to the internet with a fixed wire.

4.   Define HTTP.

Ans: The hypertext transfer protocol (HTTP) is a stateless, lightweight, application level protocol for data transfer between servers and clients. The first version, HTTP/1.0 (Berners-Lee, 1996), never became a formal standard due to too many variant implementations.

5.   What are the solutions in WAP?

Ans: Interoperable, Scalable, Efficient, Reliable and Secure.

6.   Define WAE.

Ans: The main idea behind the wireless application environment (WAE) is to create a general-purpose application environment based mainly on existing technologies and philosophies of the world wide web (WAP Forum, 2000g).This environment should allow service providers, software manufacturers, or hardware vendors to integrate their applications so they can reach a wide variety of different wireless platforms in an efficient way.

7.   Define WML Script.

Ans: WML Script complements to WML and provides general scripting capability in the WAP architecture (WAP Forum, 2000h). While all WML content is static(after loading on the client).

8.   Define PPG.

Ans: Similar to the WTA gateway for pull services, the PPG provides many functions to transform protocol messages and content exchanged between server and client (WAP Forum, 2000w). The PPG accepts push messages from a PI and checks if this message can be forwarded to the client.

9.   Write any two service Primitives in.

Ans: po-push: unacknowledged push of content within a push session via a connection-oriented service (maps to S-Push in WSP). po-confirmed push: acknowledged push of content within a push session via a connection-oriented service (maps to S-Confirmed Push in WSP).

10.   What is meant by i-mode?

Ans: The i-mode service was introduced in Japan by the mobile network operator NTT DoCoMo in 1999. While other network operators in Japan (e.g., KDDI) use WAP, NTT DoCoMo decided to use its own system which is roughly based on the web protocols and content formats known from the www.

11.   List out of the components in protocol frame work.

Ans: • Bearer networks. Transport services. Transfer services. Session services.

FIVE MARKS
UNIT – I INTRODUCTION OF MOBILE COMMUNICATION

1. List out the Functions of physical layer.
2. Explain about FDM.
3. Explain about direct sequence spread spectrum.
4. Explain about market for mobile communications.
5. Explain about simplified reference model
6. Explain about signals.
7. Explain about antennas.
8. Explain about cellular systems.
9. Explain about spread spectrum.
10. Explain in the following terms: i) SDMA   ii) FDMA   iii) TDMA   iv) CDMA.

UNIT – II TELECOMMUNICATION SYSTEM

1. Explain about GSM
2. Explain about mobile services
3. Explain about radio interface
4. Explain the protocols
5. Explain about security
6. Explain the system architecture
7. Explain about UTRAN
8. Explain about the UMTS system architecture

UNIT – III WIRELESS LAN

1. Explain about system architecture of Wireless LAN.
2. Explain about MAC layer.
3. Explain the direct sequence spread spectrum.
4. Explain about roaming.
5. Explain WATM.
6. Disadvantages of WLAN.
7. Give the steps for roaming between access points.
8. Explain about security.

UNIT – IV MOBILE IP

1. Explain about two different ways of registration.
2. Explain tunneling and encapsulation in mobile IP.
3. Write the advantages and disadvantages of cellular IP.
4. Explain the dynamic source routing and flat-ad-hoc routing.
5. What advantages does the use of IPv6 offer for mobility?
6. Differences between AODV and the standard distance vector algorithm.
7. Explain about mobile ad-hoc networks.
8. Explain about Hawaii.

UNIT – V WIRELESS APPLICATION PROTOCOL

1. Explain about coda.
2. Explain WWW.
3. Explain WAP.
4. List out of the components in protocol frame work.
5. Explain about push architecture.
6. What are major differences between WAP 2.0 and WAP 1.x?
7. Compare the presented protocol stacks for WAP 2.0 and give application examples.

TEN MARKS

UNIT – I INTRODUCTION OF MOBILE COMMUNICATION

1. Explain the functions of the layer in wireless and mobile environment.
2. What is multiplexing? Explain its types in details.
3. Comparison of SDMA, FDMA, TDMA and CDMA.
4. Explain about Medium Access control.
5. Write a brief notes on modulation.

UNIT – II TELECOMMUNICATION SYSTEM

1. Write a brief notes on mobile services.
2. Explain handover.
3. Explain about GPRS.
4. Write a brief notes on protocol architecture.
5. Explain about UMTS.
6. Write a brief notes on core network.

UNIT – III WIRELESS LAN

1. Discuss about the design goals of wireless LANs.
2. Write a brief notes on IEEE 802.11.
3. Explain about the MAC frames.
4. Write a brief notes on WATM.
5. Explain about Bluetooth with neat diagram.

UNIT – IV MOBILE IP

1. Write a brief notes on encapsulation.
2. Explain about routing.
3. Explain about the cellular IP.
4. Write a brief notes on tunneling.

UNIT – V WIRELESS APPLICATION PROTOCOL

1. Write a brief notes on HTTP.
2. Explain about WML Script.
3. Write a brief notes on push architecture.
4. Write a brief notes on HTML.