VELAMMAL COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
IT6601-MOBILE COMPUTING

QUESTION BANK

UNIT I - INTRODUCTION

Introduction to Mobile Computing – Applications of Mobile Computing- Generations of Mobile Communication Technologies- Multiplexing – Spread spectrum -MAC Protocols – SDMA- TDMA- FDMA- CDMA

<table>
<tr><th colspan="2">PART-A</th></tr>
<tr><th>Sl.NO</th><th>Question</th></tr>
<tr><td>1.</td><td>What is Mobile Computing?
Mobile Computing (also known as nomadic computing (or) Ubiquitous Computing) is widely described as the ability to compute remotely while on the move. This has made it possible for people to access information from anywhere and at anytime.</td></tr>
<tr><td>2.</td><td>Differentiate Mobile Computing and wireless networking.
<table><tr><th>Mobile Computing</th><th>Wireless Networking</th></tr><tr><td>It denotes accessing information and remote computational services while on the move</td><td>It provides basic infrastructure necessary to make these services possible</td></tr><tr><td>It requires the application themselves- the design and deployment, and hardware at the client and server sides</td><td>It forms important and necessary ingredient of mobile computing</td></tr></table></td></tr>
<tr><td>3.</td><td>List the advantages of mobile computing
• User can change location while communicating to invoke computing services at some remote computers
• Provides tremendous flexibility to the users , the user need not be tethered to the chair in front of the desktop, they can move locally or faraway places and at the same time to achieve what used to be performed while sitting in front of desktop.</td></tr>
<tr><td>4.</td><td>List the applications of mobile Computing
• Vehicles
• Emergencies
• Business
• Replacement of Wired networks
• Entertainment, Infotainment etc</td></tr>
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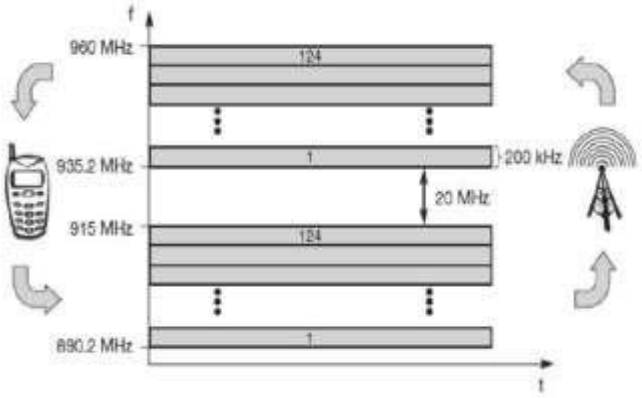
5.	***List the characteristics of mobile Computing*** • Ubiquity • Location awareness • Adaptation • Broadcast • Personalization
6.	**How 2.5G differs from2G?** 2.5G implements packet switching along with the circuit switching in 2G

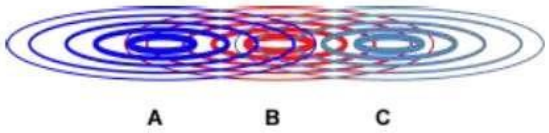
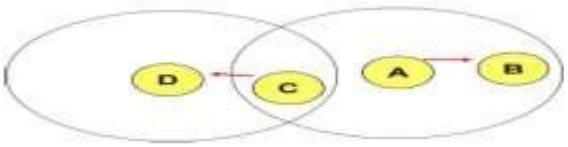
	• 2.5G has much faster data rates than 2G • 2.5G allows limited web browsing while 2G does not • 2.5G has MMS services while 2G does not
7.	**Differentiate circuit switching and packet switching**.

Circuit Switching	**Packet Switching**
Connection oriented.	Connectionless.
Initially designed for Voice communication.	Initially designed for Data Transmission.
Inflexible, because once a path is set all parts of a transmission follows the same path.	Flexible, because a route is created for each packet to travel to the destination.
Message is received in the order, sent from the source.	Packets of a message are received out of order and assembled at the destination.
Circuit Switching is implemented at Physical Layer.	Packet Switching is implemented at Network Layer.

8.	**Define Multiplexing'** Multiplexing describes how several users can share a medium with minimum or no interference. One example, is highways with several lanes. Many users (car drivers) use the same medium (the highways) with hopefully no interference (i.e., accidents). This is possible due to the provision of several lanes (space division multiplexing) separating the traffic. In addition, different cars use the same medium (i.e., the same lane) at different points in time (time division multiplexing).
9.	**What is DSSS?** In telecommunications, **direct-sequence spread spectrum** (**DSSS**) is a spread-spectrum modulation technique primarily used to reduce overall signal interference. The direct-sequence modulation makes the transmitted signal wider in bandwidth than the information bandwidth. After the despreading or removal of the direct-sequence modulation in the receiver, the information bandwidth is restored, while the unintentional and intentional interference is substantially reduced.

10.	**What is FHSSS?** **Frequency-hopping spread spectrum** (**FHSS**) is a method of transmitting radio signals by rapidly changing the carrier frequency among many distinct frequencies occupying a large spectral band. The changes are controlled by a code known to both transmitter and receiver. FHSS is used to avoid interference, to prevent eavesdropping, and to enable code-division multiple access (CDMA) communications.
11.	**Discuss about FDD** A scheme called **frequency division duplexing (FDD)** in which the two directions, mobile station to base station and vice versa are now separated using different frequencies. The two frequencies are also known as **uplink**, i.e., from mobile station to base station or from ground control to satellite, and as **downlink**, i.e., from base station to mobile station or from satellite to ground control.

	
12.	**What are the benefits of spread spectrum** 1. Robustness against narrow band interference 2. Relatively high security 3. Coexistence of several signals – the receiver can 4. separate each user based on code 5. No need of frequency planning as all user uses same BW 6. Wide band signals – less prone to interference, less prone to fading
13.	**How guard spaces are realized between users in CDMA** The guard spaces are realized between users in CDMA using orthogonality and good auto correlation. Two vectors are called orthogonal if their inner product is 0, as is the case for the two vectors (2, 5, 0) and (0, 0, 17): (2, 5, 0)*(0, 0, 17) = 0 + 0 + 0 = 0. The Barker code (+1, −1, +1, +1, −1, +1, +1, +1, −1, −1, −1), for example, has a good autocorrelation, i.e., the inner product with itself is large, the result is 11.

14.	***What is the purpose of MAC protocols*** The primary responsibility of a MAC protocol is to enforce discipline in the access of a shared channel when multiple nodes contend to access the channel. The main objectives are maximization of the utilization of the channel and minimization of average latency of transmission. MAC protocol has to make sure that no node has to wait for an unduly long time, before it is allowed to transmit
15.	***Mention the properties required for MAC protocols.*** • It should implement some rules that help to enforce discipline when multiple nodes contend for a shared channel. • It should help maximize the utilization of the channel • Channel allocation needs to be fair. • It should be capable of supporting several types of traffic having maximum and average bit rates. • It should be robust in the face of equipment failures and changing network conditions
16.	*Explain hidden terminal problem in infrastructure-less network*  A and C cannot hear each other.A sends to B, C cannot receive A.C wants to send to B, C senses a "free" medium (CS fails).Collision occurs at B. A cannot receive the collision (CD fails).A is "hidden" for C.
17.	***Explain Exposed terminal problem in infrastructure-less network***  A starts sending to B..C senses carrier, finds medium in use and has to wait for A->B to end.D is outside the range of A, therefore waiting is not necessary.
18.	***List Some Fixed Assignment schemes*** • Frequency division Multiple access (FDMA) • Time division Multiple access(TDMA) • Code division Multiple access (CDMA)
19.	***List Some Random Assignment scheme*** • ALOHA • Slotted ALOHA • CSMA • CSMA/CD • CSMA/CA

20.	**Mention the use of SDMA** SDMA is used for allocating a separated space to users in wireless networks. A typical application involves assigning an optimal base station to a mobile phone user.
21.	***Define ALOHA*** Pure ALOHA does not check whether the channel is busy before transmitting. If the frame successfully reaches the destination, it is sent again. It works well when the contention is small
22.	***Define Slotted ALOHA*** The Slotted ALOHA employs beacon signals that are sent at precise intervals that mark the beginning of the slot at which point the nodes having data to send can start to transmit.
23.	***Define CSMA*** In Carrier sense multiple access (CSMA), a node senses the medium before starting to transmit. If it senses that some transmission is underway, it defers its transmission. Two popular extensions of CSMA are the Collision Detection CSMA/CD and the Collision Avoidance CSMA/CA schemes.

PART-B		
Sl.NO	Question	Marks
1.	Explain the various applications of mobile computing	6
2.	Compare different generations of mobile communication technology	13
3.	Explain about different types of multiplexing techniques with neat sketch	13
4.	Discuss about different spread spectrum techniques used in mobile communication	13
5.	Explain in detail about hidden terminal problem and Exposed terminal problem (or) Explain various Wireless MAC issues in detail	8
6.	Explain in detail about FDMA,TDMA and CDMA with suitable diagram	13
7.	Explain in detail about TDMA with neat sketch	13