Subject Name: Mobile Computing and Wireless Communication
Subject Code:2170710

Faculty : Varsha Tank

Sr.No	CHAPTER NO - 1 : Introduction:	Marks
	TOPIC:1 Introduction Transmission Fundamentals	
	DESCRIPTIVE QUESTIONS	
1.	Explain Signals for conveying information. **[L.J.I.E.T]**	7
2.	Explain Analog and Digital data transmission**[L.J.I.E.T]**	7
3.	Define: Peak Amplitude (*A*), Frequency (*f*) and Period (*T*).**(Nov-2017)[L.J.I.E.T]**	3
4.	What is the relationship between datarate and its bandwidth? **[L.J.I.E.T]**	7
5.	Define Channel Capacity. Define its key factors that affect it. **(Nov-2017)[L.J.I.E.T]** What do you mean by channel capacity? What are the factors that affect it? **[New](Nov-2018)[L.J.I.E.T]**	3,3
6.	Define channel capacity. Write Shannon and Nyquist capacity formula. State the key factors that affect channel capacity.**[New](Nov-2016)[L.J.I.E.T]**	7
7.	Explain Nyquist theorem? Find the relationship among the following terms Channel Capacity (C), Bandwidth (B) and Signal-to-Noise Ratio (SNR)**. (May-2017) (May-2018)[L.J.I.E.T]**	7,7
8.	What is the Nyquist Theorem and Why Does it Matter?**[New] (Nov-2020)[L. J.I.E.T]**	3
9.	Explain the Transmission Media. **(May-2018)[L.J.I.E.T]**	3
10.	What is noise? Discuss briefly types of noise and its effect on transmission signal**. [New](Nov-2018)[L.J.I.E.T]**	4
11.	Explain various transmission media w.r.t. merit, demerits and application of each.**[New](Nov-2018)[L.J.I.E.T]**	4
12.	Compare Guided and Unguided media with its applications. **[New] (Nov-2020)[L. J.I.E.T]**	04
	NUMERICALS	
1.	Given a channel with an intended capacity of 50 Mbps, the bandwidth of the Channel is 5 MHz. What signal-to-noise ratio is required to achieve this capacity? **[New](Nov-2016)[L.J.I.E.T]**	3
2.	We have a channel with a 1-MHz bandwidth. The SNR value for this channel is 63. What are the appropriate Bit rate and Signal level using Shannon's and Nyquist's Formula?**[New] (Nov-2020)[L. J.I.E.T]**	4
3.	A typical voice channel has SNR as 30dB and Bandwidth as 2.7KHz. Calculate the approximate maximum information capacity of the channel?**[New] (Nov-2020)[L. J.I.E.T]**	4
	TOPIC 2. Communication	
	DESCRIPTIVE QUESTIONS	
1.	Briefly describe the following networks with example and application: 1. Wired network 2. Wireless network. **[New] (May-2015)[L.J.I.E.T]**	5
2.	Explain LAN, WAN, MAN. **[L.J.I.E.T]** Compare the LAN and WAN. **(May-2018)[L.J.I.E.T]**	7,7
3.	Explain Circuit switching. **[L.J.I.E.T]**	7
4.	Write advantages and disadvantages of packet switching over circuit switching.**[New](Nov-2016)[L.J.I.E.T]**	7
5.	Differentiate: Circuit Switching and Packet Switching. **(Nov-2017)[L.J.I.E.T]** What is the circuit switching? Explain the communication phases of circuit switching. Differentiate between Datagram and Virtual circuit operation? **(May-2017)[L.J.I.E.T]**	4,7,7,4,4

	Describe the Switching Techniques. Differentiate the Circuit Switching and Packet Switching. **(May-2018)[L.J.I.E.T]** Differentiate circuit switching and packet switching. **[New](Nov-2018)[L.J.I.E.T]** Explain packet switching and circuit switching.**[New](May-2019)[L.J.I.E.T]**	
	TOPIC 3. Protocols and the TCP/IP Suite	
	DESCRIPTIVE QUESTIONS	
1.	What is the need of protocol architecture? Explain TCP/IP protocol in brief. **[L.J.I.E.T]** Describe the TCP/IP Protocol Architecture. **(May-2018)[L.J.I.E.T]**	7,3
2.	Explain OSI model with function of each layer. List the name of layer which implemented the following Bridge, Gateway, and Repeater. **(May-2017)[L.J.I.E.T]**	7
3.	Explain the terms with respect to OSI Model : Frame , Packet & Segment.**[New] (Nov-2020)[L.J.I.E.T]**	3
4.	Compare: OSI Model and TCP/IP Protocol Architecture. **(Nov-2017)[L.J.I.E.T]**	4
5.	Why is UDP needed? Why can't user program directly access IP? **[New] (Nov-2016) [L.J.I.E.T]**	7
6.	Compare and contrast OSI model and TCP/IP protocol architecture. **[New](Nov-2018)[L.J.I.E.T]**	7
	CHAPTER NO – 2: Cellular Wireless Networks:	
	TOPIC 1. Cellular Wireless Networks	
	DESCRIPTIVE QUESTIONS	
1.	Explain the differences between 1G, 2G, 2.5G and 3G mobile communications**.(June-2012)[L.J.I.E.T]** what are the essential functional differences between 1st generation, 2nd generation and 3rd generation of networks?**(Dec-2012)[L.J.I.E.T]** What are the essential functional differences between 1st generation, 2nd generation and 3rd generation of networks? **[New] (May-2015)[L.J.I.E.T]** Explain: 2G v/s 3G**.[New] (Dec-2015)[L.J.I.E.T]**	7,4,7, 4
2.	Write short note on: 1G, 2G, 2.5G and 3G mobile communications**. [New] (Dec-2013) (Dec-2018) [L.J.I.E.T]** Explain the 1G, 2G, 2.5G and 3G Mobile Communications.**(May-2018)[L.J.I.E.T]**	7,7,7
3.	Explain 3G networks. How is a 3G network different from a 2G CDMA network? **[New] (Dec-2016)[L.J.I.E.T]**	7
	TOPIC 2. Antennas and Propagation	
	DESCRIPTIVE QUESTIONS	
1.	What is antennas? Explain types of antennas. **[L.J.I.E.T]**	7
2.	What is Antenna Gain? Explain with its formula **(Nov-2017)[L.J.I.E.T]**	3
3.	Explain different types of Propagation Mode. **[New](Winter-2012)[L.J.I.E.T]**	7
4.	What are propagation modes? Explain free Space loss propagation modes in details? **(May-2017)[L.J.I.E.T]**	7
5.	Define Reflection, Refraction and diffraction.**[New](May-2019)[L.J.I.E.T]**	3
6.	Explain in brief LOS wireless transmission and its significant impairments. **[L.J.I.E.T]**	7
7.	What is Multi-path propagation and fading?**[New](May-2019)[L.J.I.E.T]**	4
8.	What is wave propagation? Discuss various modes of propagation with example.**[New] (Nov-2020)[L.J.I.E.T]**	7
9.	What is fading? Differentiate **[New](Nov-2016)[L.J.I.E.T]** i. Fast and slow fading ii. Flat and selective fading.	7
10.	Explain the term Fading and its types in the Mobile Environment in detail.**(May-2018)[L.J.I.E.T]**	7
11.	Define following. 1) Fading	3

	2) Modulation**[New](Nov-2018)[L.J.I.E.T]**	
	TOPIC 3. Modulation Techniques	
	DESCRIPTIVE QUESTIONS	
1.	Explain ASK, FSK , PSK, QPSK in Detail. **[L.J.I.E.T]**	7
2.	Define ASK, FSK & PSK.**[New](Nov-2018) [L.J.I.E.T]**	3
3.	Explain Delta Modulation with their Transmission and Reception block diagram?**(May-2017) (Nov-2017) [L.J.I.E.T]** Enlist and Explain the different Modulation Techniques in the signal theory.**(May-2018)[L.J.I.E.T]**	7, 7,4
4.	Differentiate Amplitude, Frequency and Phase Shift Keying in Digital Modulation with proper diagram.**[New] (Nov-2020)[L. J.I.E.T]**	4
5.	What is the bandwidth efficiency for FSK, ASK, PSK and QPSK for a bit error rate of 10^{-7} on a channel with an SNR of 12 dB? **[New] (Nov-2016)[L.J.I.E.T]**	7
	TOPIC 4. Spread Spectrum	
	DESCRIPTIVE QUESTIONS	
1.	What is spread spectrum technology? Compare it with narrow band. **[New](June-2014)[L.J.I.E.T]**	7
2.	Explain various spreading techniques used in spread spectrum. **[New](May-2017)[L.J.I.E.T]**	7
3.	Define spreading sequence. List different categories of spreading sequences. Explain Walsh code with example. **[New] (Nov-2016) [L.J.I.E.T]**	7
4.	What is Walsh function? Explain it for CDMA orthogonal codes **(Winter-2013)(Summer-2015) [L.J.I.E.T]**	7,7
5.	What is frequency hopping in spread spectrum? Explain TDMA in detail.**[New](Dec-2015)[L.J.I.E.T]** Define frequency hopping in spread spectrum. Write Note on TDMA,FDMA,CDMA. **(Nov-2011) (May-2018)[L.J.I.E.T]** Explain frequency hopping spread spectrum.**[New](May-2019)[L.J.I.E.T]**	7,7,7,7
6.	Define FHSS. Discuss advantages and applications of FHSS.**[New] (Nov-2020)[L. J.I.E.T]**	4
7.	Explain the Direct Sequence Spread Spectrum Techniques.**[New](May-2013)[L.J.I.E.T]** Explain in detail Direct Sequence Spread Spectrum Techniques (DSSS). **(Winter-2014)[New] (Dec-2013)(Summer-2015) (Nov-2017) (May-2018)[New](May-2018)[L.J.I.E.T]** Explain Direct sequence spread spectrum with example. **[New] (May-2015)[L.J.I.E.T]** What is direct sequence spread spectrum technology? Explain how it works in the CDMA technology? **(Dec-2012)(Summer-2013) (May-2017)[New](Nov-2018)[L.J.I.E.T]** What is CDMA technology? Explain the Direct Sequence Spread Spectrum Techniques.**[New] (Dec-2014)[New](May-2016)(Dec-2018)[L.J.I.E.T]**	6,7,7, 7, 7, 7 , 7, 7, 7, 7, 7, 7,7,7,7
8.	What is CDMA technology? Explain Direct Sequence Spread Spectrum.**[Dec-2020][L.J.I.E.T]**	7
9.	What is DSSS? Explain CDMA chip sequence with example. **(Winter-2013) [L.J.I.E.T]**	7
10.	What is multiplexing? Explain FDM and TDM in details with one example.**(May-2017)[L.J.I.E.T]** Define the term Multiplexing. Explain the FDM and TDM with one example each.**(May-2018)[L.J.I.E.T]**	7,4
11.	Why Multiplexing is needed in wireless communication and What is the use of Guard band in telecommunication networks?**[New] (Nov-2020)[L. J.I.E.T]**	3
12.	Explain various signal multiplexing techniques.**[New](May-2019)[L.J.I.E.T]**	7
	NUMERICALS	
1.	In a CDMA network, assume there are four stations A, B, C, and D with their chip sequences,	7

	shown in Fig. 1. Fig. 2 shows four cases of four stationstransmitting at the same time. Show the transmitted sequences S1 to S4 and how DSSS does the recovery at receiver. [**New**]**(Dec-2013)[L.J.I.E.T]** A: 00011011 B: 00101110 C: 01011100 D: 01000010 Fig 1: bit sequence A B C D - - 1 - C sent 1 - 1 1 - B & C sent 1 1 0 - - A sent 1 & B sent 0 1 1 0 1 A sent 1, B sent 1, C sent 0 & D sent 1 Fig. 2 transmition details	
2.	In a CDMA network, assume there are two stations A (chip sequence: 00011011) and E (chip sequence: 00101110). Figure-1 shows two cases of both stations transmitting at the same time. Show the transmitted sequences S1 and S2 and how DSSS does the recovery at receiver. **A E** 1 0 A sent 1 and B sent 0 0 - only A sent 0 (Figure-1) **[New] (Nov-2016) [L.J.I.E.T]**	7
	TOPIC 5. Coding and Error Control	
	DESCRIPTIVE QUESTIONS	
1.	What is Error? And Explain Type of Error. **[L.J.I.E.T]**	7
2.	Describe the Error Control Coding in detail.**(May-2018)[L.J.I.E.T]**	4
3.	Explain Error Detection. **[L.J.I.E.T]**	7
4.	Describe Error Control Coding in brief. **[New](Nov-2018)[L.J.I.E.T]**	4
5.	Describe any one error detection technique with suitable example.**[New](May-2019)[L.J.I.E.T]**	4
6.	Explain Hamming Code. **[L.J.I.E.T]**	7
7.	Explain Convolutional Codes. **[L.J.I.E.T]**	7
8.	Explain Automatic repeat request. **[L.J.I.E.T]**	7
9.	What is the need of ARQ? Explain Automatic Repeat Request (ARQ) in details? **(May-2017)[L.J.I.E.T]**	7
10.	What is the need for ARQ? Explain Sliding Window Protocol with example. **(Nov-2017)[L.J.I.E.T]**	7
11.	How Error Control is implemented using Automatic Repeat Request (ARQ) mechanism?**[New] (Nov-2020)[L. J.I.E.T]**	7
12.	What is ARQ? What is importance of it? **[New](Nov-2018)[L.J.I.E.T]**	3
13.	Write a short note on selective repeat ARQ.**[New](May-2019)[L.J.I.E.T]**	4
	NUMERICALS	
1.	For Message M = 1010001101 and Pattern P = 110101, find CRC. **(Nov-2017)[L.J.I.E.T]**	4
	CHAPTER NO -3: Multiple Access in Wireless System:	
	TOPIC 1. Multiple access scheme	
	DESCRIPTIVE QUESTIONS	
1.	Explain the following Multiple Access Techniques used to access the channel by mobile	7

	subscriber. **(June-2012)[L.J.I.E.T]** • Frequency Division Multiple access. • Space Division Multiple access.	
2.	Explain the following Multiple Access Techniques used to access the channel by mobile subscriber. **(June-2012)[L.J.I.E.T]** • Time Division Multiple access. • Code Division Multiple access.	7
3.	Explain FDMA with example of Frequency division duplex. **[L.J.I.E.T]**	4
4.	Explain TDMA with example of Time division duplex. **[L.J.I.E.T]**	4
5.	What is CDMA? Explain the orthogonal codes for it. **[New] (Dec-2015)(Dec-2020] [L.J.I.E.T]**	7,7
6.	Why medium access control (MAC) is required in wireless networks? Explain with hidden and Exposed terminals & near and far terminals. **[L.J.I.E.T]**	7
7.	What is hidden terminal problem? How it can be avoided? **(Nov-2017)[L.J.I.E.T]**	3
8.	Discuss hidden and exposed terminals.**[New](May-2019)[L.J.I.E.T]**	3
9.	Explain Hidden Station and Exposed Station Problem in wireless network. Propose the solution for the problem.**[New] (Nov-2020)[L. J.I.E.T]**	4
10.	Explain in brief Multiple access with collision avoidance (MACA). Justify how MACA can avoid hidden terminal problem. **[L.J.I.E.T]**	7
11.	Explain in brief Multiple access with collision avoidance (MACA). Justify how MACA can avoid exposed terminal problem. **[L.J.I.E.T]**	7
12.	Why do MAC scheme in wired network fail in wireless networks. Explain how the multiple access with collision avoidance (MACA) scheme work does. **(Dec-2012)[L.J.I.E.T]**	7
13.	Explain DFWMAC-DCF using CSMA/CA.**[New](May-2019)[L.J.I.E.T]**	7
	NUMERICALS	
1.	Alular system uses FDMA with spectrum allocation of 12.5 MHz in each direction, a guard band at the edge of the allocated spectrum of 10 KHz, and a channel bandwidth of 30 KHz. Find out number of channels available. **(Nov-2017) [L.J.I.E.T]**	4
2.	Consider Global System for Mobile, which is TDMA/FDD system that uses 25 MHz for the forward link, which is broken in to radio channels of 200 KHz. If 8 speech channels are supported on a single radio channel and if no guard band is assumed, find the no of simultaneous users that can be accommodated in GSM. **(Nov-2017) [L.J.I.E.T]**	4
	TOPIC 2. Global system for mobile communication(GSM)	
	DESCRIPTIVE QUESTIONS	
1.	Explain the functioning of cellular network. How the given set of frequencies are used to increase the capacity of a network. **(June-2012)[L.J.I.E.T]** What is Cellular network? Explain frequency allocation in GSM network. **(Summer-2014)[L.J.I.E.T]**	7,7
2.	Explain following : **[New] (Dec-2014)[L.J.I.E.T]** i. Draw: Cellular Structure. [Marks : 1] ii. Justify: Cell shape is Hexagon. [Marks : 2] iii. How to reuse the limited frequency band in cellular architecture [Marks : 4] [Explain Diagrammatically. Make following assumption: Frequency Band :100-170 Cluster Size : 7]	7
3.	Explain the essential characteristics of frequency reuse concept. Draw and explain cell cluster in GSM for k=4.**[New](May-2017) [L.J.I.E.T]**	7
4.	Describe Cell Splitting and Cell Sectoring with its limitations in detail.**[New] (Nov-2020)[L. J.I.E.T]**	7
5.	What is the principle of frequency reuse in context of cellular networks? List the ways of	7,3,7,7,

	increasing the capacity of a cellular system? **(May-2017)[L.J.I.E.T]** What is Frequency Reuse? Explain with proper diagram. **(Nov-2017)[L.J.I.E.T]** What is Frequency Reuse? Explain Frequency Allocation in GSM. **[New](May-2016) [New](May-2018)(Dec-2018)[L.J.I.E.T]**	7
6.	Explain different types of power control techniques in cellular networks. **(Nov-2017)[L.J.I.E.T]**	4
7.	What is Cellular network? Explain GSM architecture in detail. **(Winter-2015)[L.J.I.E.T]**	7
8.	Explain functional architecture of GSM system. And also give different tele-services provided by GSM.**(Nov-2011) (May-2017) [L.J.I.E.T]** Explain functional architecture of GSM system and types of services provided by GSM. **[New](Nov-2018)[L.J.I.E.T]**	7,7,7
9.	Draw and explain GSM architecture. **(Winter-2013)[L.J.I.E.T]** Explain GSM architecture and role of its components.**(Summer-2014) [New] (Nov-2016)(Nov-2017)[L.J.I.E.T]** List out GSM Specification and explain functional architecture of GSM.**[New](Winter-2012)[L.J.I.E.T]** Explain functional architecture of GSM**. [New] (Dec-2014)[L.J.I.E.T]** Draw and explain System architecture of GSM **[New] (May-2015)[L.J.I.E.T]** Discuss GSM architecture in detail.**[New](May-2019)[L.J.I.E.T]** Explain GSM architecture. **(Dec-2018) [L.J.I.E.T]**	7, 7, 7, 7, 7, 7,7,7,7,7
10.	In GSM network, explain the role of Network and Switching subsystem. **(Summer-2013)[L.J.I.E.T]**	7
11.	Explain term : BSS. **[New] (June-2014)[L.J.I.E.T]**	3
12.	List and explain GSM entities**. (Winter-2013)[L.J.I.E.T]**	7
13.	Explain the importance of following identifiers with that GSM is deals with: **[New] (May-2013)[L.J.I.E.T]** • IMEI • IMSI • MSISDN Define IMSI, TMSI, IMEI and MS-ISDN and write their use.**[New] (Dec-2013) [L.J.I.E.T]** Describe different GSM addresses and identifiers **[New] (May-2015)[L.J.I.E.T]** Define IMSI, IMEI and MS-ISDN and write their use**(Nov-2017)[L.J.I.E.T]** List and explain various addresses and identifiers used in GSM. **[New](May-2017)[L.J.I.E.T]** Define IMSI, IMEI and MS-ISDN and write significance of each. **[New](Nov-2018)[L.J.I.E.T]**	8,7,7,7, 7,3
14.	Explain Addresses and Identifiers used in GSM with Example.**[New] (Nov-2020)[L. J.I.E.T]**	7
15.	Explain the following in brief in context of GSM networks: **(Summer-2013)[L.J.I.E.T]** (a) Mobile station (b) BSS (c) NSS (d) OSS (e) IMSI (e) IMEI (f) MSRN	7
16.	How is Mobility Management done in GSM? List the various handovers carried out in GSM and explain any one of them in detail. **(Dec-2012)[L.J.I.E.T]** Explain the handover procedure in GSM system.**[New] (May-2013) [New] (Dec-2013) [New] (June-2014) [New] (Dec-2014) [New] (Dec-2016) [New](May-2018)[L.J.I.E.T]** Explain Handoff in detail.**[New](Nov-2016)[L.J.I.E.T]** What is handoff? Explain its various types. **(Nov-2017)[L.J.I.E.T]**	7, 8, 7, 7, 7, 7,7,7,7
17.	What are the possible handover scenarios in GSM? List out the numbers needed to locate a Mobile Station and to address the Mobile station **(Nov-2011)[L.J.I.E.T]**	7
18.	Compare Paging and Location update in GSM.**[New] (Nov-2020)[L. J.I.E.T]**	3
19.	What is handover/handoff? How handoff is different from roaming? **[New] (May-2015)[L.J.I.E.T]** What is handoff and Roaming? Explain the types of handoff in details? **(May-2017)[L.J.I.E.T]** What is Handover? Explain types of it in brief. **[New](Nov-2018)[L.J.I.E.T]**	7,7,4, 4

	Explain handover process in cellular system.**[New](May-2019)[L.J.I.E.T]**	
20.	Illustrate different scenarios of Roaming and Handoff in GSM with proper Examples.**[New] (Nov-2020)[L. J.I.E.T]**	7
21.	What is Handover? Explain GSM Architecture with suitable diagram.**[New](May-2016)[Dec-2020][L.J.I.E.T]**	7,7
22.	Explain Call routing in GSM with block diagram. **[New] (June-2014) (Dec-2018) [L.J.I.E.T]** Explain Call routing in GSM. **(Summer-2014)[New] (Dec-2016) [L.J.I.E.T]** What is GSM? Explain how a call is routed in GSM with diagram**. [New] (Dec-2015)[L.J.I.E.T]** Explain Call routing in GSM network. **(Winter-2015)[L.J.I.E.T]** Explain routing in mobile network. **(Winter-2015) [L.J.I.E.T]** Explain GSM call routing. **[New](May-2019)[L.J.I.E.T]**	7, 7, 7, 7, 7, 7, 7,7
23.	Explain mobile originated call and mobile terminated call procedure. **[New] (Winter-2012)[L.J.I.E.T]** Explain call routing for a mobile terminating call. **(Winter-2013)[L.J.I.E.T]** Draw and Explain Call routing for a mobile terminating call in GSM.**(Winter-2014)[L.J.I.E.T]**	7, 7, 7
24.	What are HLR and VLR? Describe its functions in call routing and roaming.**(June-2012) (May-2018)[New](Nov-2018)[L.J.I.E.T]** Explain the functionality of HLR and VLR in call routing.**[New] (Dec-2015) (Dec-2020) [L.J.I.E.T]**	7, 4,4,7,7
25.	Explain the purpose of Home Location Register (HLR). List the information which is stored in Home Location Register (HLR)**[New] (Nov-2020)[L.J.I.E.T]**	03
26.	Explain Different types of GSM Channels. **[New](Winter-2012)[L.J.I.E.T]**	7
27.	Write Note on Signaling Protocol Structure in GSM**. [New] (Dec-2014)[L.J.I.E.T]**	7
28.	Explain: Handover, Authentication and Security in GSM. **(Summer-2014) (Winter-2015)(May 2018)[L.J.I.E.T]**	7, 7, 4
29.	Give six functions where CDMA is different from GSM. **(June-2012)[L.J.I.E.T]** Differentiate CDMA technology and GSM technology. **[New](Winter-2012)[L.J.I.E.T]** Give six functional differences between CDMA and GSM. **(Summer-2013)[L.J.I.E.T]** List and discuss at leastseven functions where CDMA is different from GSM**. [New] (Dec-2013)[L.J.I.E.T]** Compare : CDMA and GSM**(Summer-2014) (Winter-2015) (May-2016) (Nov-2017) [New](Nov-2018)[L.J.I.E.T]** Differentiate GSM and CDMA.**[New](May-2019) [L.J.I.E.T]**	6, 7, 7, 3, 7, 7, 7, 7,3,3
	TOPIC 3. General packet radio Service(GPRS)	
	DESCRIPTIVE QUESTIONS	
1.	What kind of changes need in GSM to Convert it into GPRS explain that? Explain application of GPRS? **(May-2017)[L.J.I.E.T]**	7
2.	Explain functional architecture of GPRS system. What is the frequency range of uplink and downlink in GPRS network? **(Nov-2011)[L.J.I.E.T]** Explain the GPRS system architecture. **(June-2012)[L.J.I.E.T]** Draw and explain GPRS architecture. **[New] (June-2014)[L.J.I.E.T]** Explain GPRS operations with its architecture. **(Summer-2014) (Winter-2015)[[L.J.I.E.T]** Draw GPRS System Architecture. Discuss GPRS network enhancement over GSM. **[New](May-2017)(Dec-2018)[L.J.I.E.T]**	7, 8, 7, 7, 7,7,7
3.	Discuss the network elements in GPRS that are different from GSM. Also discuss applications and limitations of GPRS. **[New] (Nov-2016)[New](Nov-2018)[L.J.I.E.T]**	7,7
4.	Define SGSN and GGSN. **[New] (Dec-2013)[L.J.I.E.T]**	3
5.	Describe what are the limitations of GPRS? **(Dec-2012)[L.J.I.E.T]** Limitations of GPRS**(Winter-2013)[L.J.I.E.T]** Write a short note on limitations of GPRS **[New](Dec-2013)[L.J.I.E.T]**	3,3, 3, 7,4

	Explain the limitations of GPRS. **[New] (Dec-2016)[L.J.I.E.T]** Discuss briefly: Limitations of GPRS. **[New](Nov-2018)[L.J.I.E.T]**	
6.	Explain GPRS system architecture. Also discuss limitations of GPRS. **[New](May-2018)[L.J.I.E.T]**	7
7.	Explain the GPRS functional architecture and application. **[New] (Winter-2012) [New] (Dec-2014) [L.J.I.E.T]** Discuss GPRS-Specific Applications. **[New] (Dec-2013)[L.J.I.E.T]**	7, 7,7
8.	Describe the applications for GPRS. **(Nov-2011) [New] (Dec-2016)[Dec-2020] [L.J.I.E.T]**	7
9.	Discuss GPRS specific applications along with limitations of GPRS. **[New](May-2017)[L.J.I.E.T]**	7,7,7
10.	Explain Term: Application and tunneling modes in GPRS **[New] (June-2014)[L.J.I.E.T]**	7
11.	Discuss data services in GPRS. Describe applications suitable for GPRS. **(Winter-2014) (Summer-2015)[[L.J.I.E.T]**	7, 7
12.	Write a note on PDP context activation procedure with respect to GPRS. **[New] (Dec-2013)[L.J.I.E.T]** What is PDP Address? Explain PDP Context Activation in GPRS. **[New](May-2016)[L.J.I.E.T]**	4,7
13.	Explain the PLMN Interface. **(May-2018)[L.J.I.E.T]**	3
14.	What is a PLMN? How is a PLMN connected to PSTN and PDN? **[New] (Dec-2016)[L.J.I.E.T]**	7
15.	How the packets are routed in GPRS. Explain GPRS packet routing for Inter & Intra PLMN. **[New] (Dec-2014) [L.J.I.E.T]** Explain routing between PLMNs for GPRS system. **[New] (June-2014)[L.J.I.E.T]** Establish the relationship between PLMN and GPRS. Explain it using block diagram. **[New] (Dec-2015)[L.J.I.E.T]** Explain Routing between PLMNs of GPRS. **[New](May-2016) [L.J.I.E.T]** Explain the data routing in GPRS. **[New] (Dec-2016)[L.J.I.E.T]**	7, 7, 7, 7, 7
16.	Explain Voice and Data Routing in GPRS with proper diagram.**[New] (Nov-2020)[L. J.I.E.T]**	3
17.	Explain call routing in the context of GPRS networks. **(Summer-2013) (Summer-2015)[L.J.I.E.T]**	7, 7
18.	How is data routing done in GPRS? In what respect is data routing different from voice routing? **(Summer-2013)[L.J.I.E.T]**	7
19.	Discuss Billing and Charging in GPRS network. **(Summer-2014)(Summer-2015) (Winter- 2015) [L.J.I.E.T]** What is GPRS? How billing and charging is done in GPRS? **(Nov-2017)[L.J.I.E.T]** How billing and charging functions are handled in GPRS? **[New](Nov-2018)[L.J.I.E.T]**	7, 7, 7,4,4
20.	Draw and Explain Transmission Plane Protocol Architecture of GPRS**. [New] (Dec-2014)[L.J.I.E.T]** Explain the GPRS Transmission Protocol Stack with the neat diagram. **(May-2018)[L.J.I.E.T]** Draw and explain the GPRS transmission plane protocol model. **[New](May-2019)[L.J.I.E.T]**	7,7,7
21.	What is the difference between GSM and GPRS? What are the networkelements in GPRS that area different from GSM? What are the limitations of GPRS. **(Summer-2013)[L.J.I.E.T]** What is the difference between GSM and GPRS? What are the network elements in GPRS that are different from GSM? **[New](Dec-2015)[L.J.I.E.T]** Differentiate the GSM and GPRS. **(May-2018)[L.J.I.E.T]**	7, 7,4
22.	What is the difference between GSM and GPRS? How is data routing done in GPRS? **[New] (May-2015)[L.J.I.E.T]**	7
23.	Compare the Following : (i) GSM and GPRS (ii) Wimax and WiFi **(May-2017)[L.J.I.E.T]**	7
24.	Explain WiFi and WiMax technology in detail. **(Dec-2018)[L.J.I.E.T]**	7
	TOPIC 4. Wireless system operations and standards	
	DESCRIPTIVE QUESTIONS	
1.	Write a note on DECT frame format. **[New] (Nov-2016) [L.J.I.E.T]**	4

2.	Explain DECT Protocol Architecture. (**Nov-2017) [L.J.I.E.T]**	3
3.	Explain architecture of IEEE 802.16 standard **[New](Winter-2012)[L.J.I.E.T]**	7
4.	Explain WiMAX three layer architecture. **[New] (May-2013)[L.J.I.E.T]**	7
5.	Explain WiMax**(Winter-2013)[L.J.I.E.T]**	3
	TOPIC 5. Mobile IP and Wireless Application Protocol	
	DESCRIPTIVE QUESTIONS	
1.	What are limitations of traditional IP to support the mobile technology? How does Mobile IP works? **(June-2012)[L.J.I.E.T]**	8
2.	Explain how does mobile IP work? What are the challenges with mobile IP with respect to high speed mobility? How does cellular IP solve some of these challenges? **(Dec-2012)[L.J.I.E.T]**	7
3.	What is cellular IP? Establish its relationship with mobile IP. **[New] (June-2014)[L.J.I.E.T]**	7
4.	Why conventional network IP is not suitable for mobile environment? How Mobile IP works? **[New] (May-2013)[L.J.I.E.T]** Why conventional network IP is not suitable for mobile environment? Describe the way in which Mobile IP works? **[New] (Dec-2014)[L.J.I.E.T]**	6, 7
5.	Compare: IP and Mobile IP. **(Summer-2014)(Winter-2015)[[L.J.I.E.T]**	7, 7
6.	How does the Mobile IP work? Explain its architecture. **(Winter-2013) (Summer-2015) [L.J.I.E.T]** What do you mean by mobile IP? How does mobile IP work?**[New] (Dec-2016)(Dec-2020) [L.J.I.E.T]** Explain operation of Mobile IP.**[New] (Nov-2016) [L.J.I.E.T]** Explain how the Mobile IP works.**(May-2018)[L.J.I.E.T]** Discuss Mobile IP.**[New](May-2019)[L.J.I.E.T]**	7, 7, 7,7, 3,7,7
7.	How does Mobile IP works? Also briefly explain Mobile Computing OS. **(Winter-2014)[L.J.I.E.T]**	7
8.	Identify the use of Mobile IP.How does Mobile IP work? **[New] (Nov-2020)[L. J.I.E.T]**	4
9.	Explain tunnelling operation in Mobile IP. Discuss the new fields in Mobile IP other than IP. **[New](May-2017) [L.J.I.E.T]**	7
10.	Explain tunnelling and encapsulation in mobile IP. **(Nov-2011)[L.J.I.E.T]**	7
11.	What is Mobile IP? Explain the tunnelling in context of Mobile IP. **(Summer-2013) [New] (May-2015) [L.J.I.E.T]** Explain the tunnelling Operation in Mobile IP. **[New] (May-2013)[L.J.I.E.T]** How mobile IP works? Explain tunnelling with mobile IP. **[New] (Dec-2015)[L.J.I.E.T]**	7, 8, 7, 7
12.	What is a mobile IP? Explain discovery, registration and tunnelling with mobile IP. **[New] (June-2014)[New] (May- 2016)(Nov-2017) [New](May-2018)[New](Nov-2018)(Dec-2018) [L.J.I.E.T]**	7, 7,7,7,7, 7
13.	What are the needs of Mobile IP? Explain handoff operation in Mobile IP. **(May-2017)[L.J.I.E.T]**	7
14.	Explain indirect TCP.**[Dec-2020][L.J.I.E.T]**	7
15.	Explain : Spread Spectrum and WAP. **(Summer-2014) (Winter-2015)[L.J.I.E.T]**	7, 7
16.	Write a short note on: WAP**[New] (Dec -2016) [New](May-2018)(Dec-2018)[L.J.I.E.T]**	7, 7,7
17.	Write a short note on WAP.**[Dec-2020][L.J.I.E.T]**	7
18.	Describe the WAP protocol stack. What are the functions of different layers in this protocol stack? **(Dec-2012)[L.J.I.E.T]** Describe the WAP protocol stack while enumerating the functions of different layers. **(Summer-2013)[L.J.I.E.T]** Explain the WAP Layered architecture and protocol stack. **[New](May-2013) [New] (Dec-2014) [L.J.I.E.T]** Explain Wireless Application Protocol (WAP) in detail. **(Nov-2017)[L.J.I.E.T]** Explain the WAP Stack with neat diagram. **(May-2018)[L.J.I.E.T]**	7, 7, 6, 7, 7, 3

19.	State the requirements of WAP and explain different layers of WAP. What are the advantages of WML Script over WML**?(Nov-2011)[L.J.I.E.T]**	7
20.	Wireless Transaction Protocol (WTP). **(Winter-2013)[L.J.I.E.T]**	4
21.	Explain the Wireless Session Protocol Primitives and Parameters.**(May-2018)[L.J.I.E.T]**	3
22.	What is a WAP gateway? What are its functions**? (Dec-2012)[L.J.I.E.T]**	4
23.	Discuss the WAP gateway for coding and encoding. **[New] (June-2014)[L.J.I.E.T]**	7
24.	Explain WAE logical model. **(Winter-2013)[L.J.I.E.T]** What is WAE? Draw its model with client, gateway and server. **[New] (June-2014)[New] (Dec-2015) [New] (May-2016) [L.J.I.E.T]**	7, 7, 7, 7
	CHAPTER NO -4: **Wi-Fi and the IEEE 802.11 Wireless LAN Standard:**	
	DESCRIPTIVE QUESTIONS	
1.	Explain IEEE 802.11 standards in details. **(Winter-2015)[L.J.I.E.T]**	7
2.	List all and explain any five IEEE 802.11 services. **[New] (Nov-2016) [L.J.I.E.T]** Enlist and Explain services provided by IEEE 802.11.**[New] (Nov-2020)[L. J.I.E.T]**	7,3
3.	Define Mobile Ad hoc Networks. Discuss its characteristics and limitations.**(Dec-2018)[L.J.I.E.T]**	7
4.	Draw and Explain the IEEE 802.11 Architecture in Details? **(May-2017)[L.J.I.E.T]** Explain IEEE 802.11 Architecture. **(Nov-2017)[L.J.I.E.T]** Explain the IEEE 802.11 Architecture with the neat diagram. **(May-2018)[L.J.I.E.T]** Explain IEEE 802.11 architecture and services. **[New](Nov-2018)** Draw and Explain IEEE 802.11 protocol architecture**. [New] (Nov-2020)[L. J.I.E.T]** **[L.J.I.E.T]**	7,4,4,7, 4
5.	Discuss with suitable diagram distributed coordination function with IEEE 802.11 medium access control logic. **[New] (Nov-2016) [L.J.I.E.T]**	7
6.	Explain Wireless LAN standards and Wireless LAN architecture**(Summer-2014) (Summer-2015) [L.J.I.E.T]**	7, 7
7.	List and explain different types of wireless LAN. **[New](Dec-2013)[L.J.I.E.T]** List types of wireless LAN. **[New] (May-2015)[L.J.I.E.T]**	7, 4
8.	Give advantages of Wireless LAN. **[New](May-2017)[L.J.I.E.T]**	7
9.	Mention some of the advantages and dis advantages of WLANS? Mention the design goals of WLANS? **(Nov-2011)[L.J.I.E.T]** What are the advantages of WLAN.**[New](May-2019)[L.J.I.E.T]**	7,3
10.	What re the advantages and disadvantages of wireless LAN? Under what situation is a wireless LAN desirable over wired LAN? **(Dec-2012)[L.J.I.E.T]**	7
11.	Draw and explain MAC frame Format in WLAN.**[New] (Nov-2020)[L. J.I.E.T]**	3
12.	Describe Wireless LAN advantages. Also explain mobility in wireless LAN. **(Winter-2014)[L.J.I.E.T]**	7
13.	How are mobility and handoff managed in wireless LAN? **(Dec-2012)[L.J.I.E.T]**	7
14.	How authentication is possible in wireless LAN? List and discuss the possible attacks on such networks. **[New] (June-2014)[L.J.I.E.T]**	7
15.	Explain Wireless LAN security issues and also explain hidden & exposed terminal problem in wireless LAN. **[New](Winter-2012) [New](May-2016) [New](May-2018)[L.J.I.E.T]** List Wireless LAN security issues and What do you understand by hidden & exposed terminal problem in wireless LAN. **[New] (Dec-2014)[L.J.I.E.T]** Discuss security issues with wireless networks. **[New] (Dec-2015)[L.J.I.E.T]** Explain wireless LAN security. **[New](May-2018)[L.J.I.E.T]**	7, 7, 7, 7, 7, 7
16.	Compare Wifi Vs. 3G and also discuss wireless LAN security issues. **(Nov-2011)[L.J.I.E.T]** Describe the contrast between 3G and Wi-Fi technologies. **(Summer-2013)(Winter-2014) (Summer-2015) [L.J.I.E.T]**	7, 7,7, 7, 6, 7,

	Compare the WiFi and 3G Technologies. **[New] (May-2013)[L.J.I.E.T]** Discuss 3G versus Wifi **[New] (May-2015)[L.J.I.E.T]**	
17.	Differentiate the WiMAX and WiFi Technologies. **(June-2012)(May-2018) [L.J.I.E.T]** What is WiMax? How is it different from WiFi? (**Dec-2012)[L.J.I.E.T]** Compare and contrast WiMAX and WiFi technologies. [**New](Dec-2013)[L.J.I.E.T]** Explain Term : WiFi v/s WiMax. **[New](June-2014)[L.J.I.E.T]** Explain Wi-Fi and Wi-Max technology in detail. Also discuss the differences.. **[New] (Dec-2015)[L.J.I.E.T]** Explain WiFi and WiMax technology in detail. **[New] (May-2016)[L.J.I.E.T]** What is WiMax?How is it different from WiFi? **[New](May-2017) [New](May-2018) [L.J.I.E.T]** What is WiMax? How it is differ from WiFi?**[Dec-2020][L.J.I.E.T]**	6, 3, 7, 3, 7, 7, 7, 7, 7,7
	CHAPTER NO -5: Bluetooth:	
	DESCRIPTIVE QUESTIONS	
1.	What is an ISM band? "It is a free band" Justify.**[New] (Dec-2013) [L.J.I.E.T]**	3
2.	Explain: Blue tooth**(Summer-2014)(Summer-2015) (Winter-2015) [L.J.I.E.T]**	4,4,4
3.	Explain the power saving states of Bluetooth device.**[New](May-2019)[L.J.I.E.T]**	3
4.	List the merits and demerits of Bluetooth. **(Dec-2012)[L.J.I.E.T]**	2
5.	Explain concept of Bluetooth Architecture. What is the difference between infrastructure and ad-hoc networks? **(Nov-2011)[L.J.I.E.T]** Differentiate infrastructure and ad-hoc network.**[New](May-2019)[L.J.I.E.T]**	7, 3
6.	Explain following protocol used in the Bluetooth technology **(June-2012)[L.J.I.E.T]** 1. Link Manager Protocol. 2. Logical Link Control and Adaptation Protocol. 3. Service Discovery protocol. 4. RFCOMM	8
7.	Explain L2CAP protocol of Bluetooth.**[New](May-2019)[L.J.I.E.T]**	4
8.	What is Bluetooth? Elaborate Bluetooth protocol stack **(Winter-2013)[L.J.I.E.T]** Explain Bluetooth Protocol Stack. **(Winter-2014) [New](May-2018)[L.J.I.E.T]** Describe protocol stack of Bluetooth **[New] (May-2015) (Dec-2018) [L.J.I.E.T]** Bluetooth Protocol Stack**. [New] (Dec-2015)[L.J.I.E.T]** Explain Bluetooth Protocol Stack in detail **[New](May-2016)[L.J.I.E.T]** Draw and explain the Bluetooth protocol stack. **[New](Dec-2016)[L.J.I.E.T]** Draw and explain Bluetooth Protocol Architecture. **(May-2017) (Nov-2017) (May-2018)[New](Nov-2018)[L.J.I.E.T]** Write a note on Bluetooth protocol stack.**[New](May-2019) [L.J.I.E.T]** Explain each layer of Bluetooth Protocol Stack.**[New] (Nov-2020)[L. J.I.E.T]**	7, 7, 7, 4,7, 7,7, 7, 7, 7, 7,7,7,7
9.	Explain Bluetooth Protocol Stack in detail. Define piconet and scatternet. **[New] (Dec-2013)[L.J.I.E.T]** Draw and explain Bluetooth protocol stack. **[New] (Nov-2016)[L.J.I.E.T]** Explain Bluetooth Protocol Stack in detail.**[Dec-2020][L.J.I.E.T]**	7, 7,7
10.	Draw the Bluetooth protocol stack and explain the host controller interface. **[New] (June-2014)[L.J.I.E.T]**	7
11.	What is piconet? What is scatternet? Explain how they form in Bluetooth radio technology? Also give the answer of following questions. **(June-2012)[L.J.I.E.T]** 1. Which ISM frequency band it is use? 2. How many maximum channel it is sup port? 3. How many maximum slave can be communicate with Master at a time? What is piconet and scatternet? Explain. How many maximum numbers of devices can communicate within one piconet? **[New] (May-2013)[L.J.I.E.T]** What is piconet and scatternet? Explain both in brief with appropriate diagrams. **[New] (Dec-**	8, 7, 7, 4,3,3

	2014)[L.J.I.E.T] Piconet in Bluetooth**. [New] (Dec-2015)[L.J.I.E.T]** Write a note on piconet and scatternet.**[New](Nov-2016)[L.J.I.E.T]** Discuss Piconet and Scatternet.**[New](May-2019)[L.J.I.E.T]**	
12.	State the applications of Bluetooth and differentiate between Piconet and Scatternet with neat diagram. **[New] (Nov-2020)[L. J.I.E.T]**	7
13.	How does a new Bluetooth device discover a Bluetooth network? For interoperability, the system needs to be open. Describe the security principles in Bluetooth. **(Dec-2012)[L.J.I.E.T]** How does a new Bluetooth device discover a Bluetooth network? Describe the security principles in Bluetooth. **(Summer-2013)[L.J.I.E.T]**	7, 7
14.	Difference between SOC and AOC client. **[New] (Winter-2012)[L.J.I.E.T]** What SOC and AOC Clients? Compare them. **[New](May-2013)[L.J.I.E.T]** Compare SOC and AOC clients**[New](May-2017)[L.J.I.E.T]** What is mobile computing? Compare SOC and AOC clients. **[New](May-2018) [Dec-2020] [L.J.I.E.T]**	4, 7, 7, 7,4
	CHAPTER NO -6: Android:	
	DESCRIPTIVE QUESTIONS	
1.	Draw Android Architecture. Also explain Android Application Framework in brief. **(Nov-2017)[L.J.I.E.T]** Explain the Android Architecture with the neat diagram. **(May-2018)[L.J.I.E.T]** Explain Android architecture with diagram. **[New](Nov-2018) [L.J.I.E.T]** Explain Android platform architecture.**[New](May-2019)[L.J.I.E.T]** Describe Android application Architecture.**[New] (Nov-2020)[L. J.I.E.T]**	7, 4,7,7,7
2.	Explain Android application framework with their components. **(May-2017)[L.J.I.E.T]**	7
3.	Explain Content Provider in Android. **[L.J.I.E.T]**	4
4.	Explain types of Intents.**[New](May-2019)[L.J.I.E.T]**	3
5.	Discuss the manifest file with example.**[New](May-2019)[L.J.I.E.T]**	4
6.	Explain Lifecycle of android API. **[L.J.I.E.T]**	7
7.	Define Android layout. Explain various Android layouts. **[New](Nov-2016) (May-2018) [L.J.I.E.T]** Explain different layout in android.**[New](Nov-2018) [L.J.I.E.T]** Discuss Activity life cycle in Android.**[New](May-2019)[L.J.I.E.T]** Enlist & Explain common layouts available in android.**[New] (Nov-2020)[L. J.I.E.T]**	7,7,7,4, 7
8.	Explain Android EditText and TextView control with an example.**[New](Nov-2016)[L.J.I.E.T]**	4
9.	Explain Android TextView control with an example. **[New](Nov-2018)[L.J.I.E.T]**	3
10.	Explain Android ButtonView control with an example. **[New](Nov-2018)[L.J.I.E.T]**	3