SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF

ELECTRONICS AND COMMUNICATION ENGINEERING

QUESTION BANK

VI SEMESTER

1906602 – WIRELESS NETWORKS

Regulation – 2019

Academic Year 2022 – 2023 (Even Semester)

Prepared by

Dr. S. Ramesh, *Professor-ECE*

Dr. N. Subhashini, *Assistant Professor (Sel. G)-ECE*

Ms. C. Kavitha, *Assistant Professor (O.G)-ECE*

SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203.

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

QUESTION BANK

SUBJECT : 1906602 – Wireless Networks
SEM / YEAR: VI / III Year

UNIT I – WIRELESS LAN

Introduction-WLAN technologies: - IEEE802.11: System architecture, Protocol architecture, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, WPAN – IEEE 802.15.4, Wireless USB, Zigbee, 6LoWPAN, Wireless HART.

Part – A

Q. No	Questions	BTL	Competence
1.	State the principle of Infrared technology.	BTL 1	Remembering
2.	List the advantages of wireless LAN.	BTL 2	Understanding
3.	Point out the major issues in WLAN.	BTL 3	Applying
4.	Analyze the significance of radio transmission over infrared.	BTL 4	Analyzing
5.	Write the significance of the special control packets in IEEE 802.11.	BTL 1	Remembering
6.	List the services provided by IEEE802.11.	BTL 1	Remembering
7.	Why the PHY layer of IEEE 802.11 is subdivided?	BTL 4	Analyzing
8.	Identify the need of WATM systems.	BTL 3	Applying
9.	Define HIPERLAN.	BTL 1	Remembering
10.	Tabulate any three differences between HiperLAN-1 and HiperLAN-2.	BTL 2	Understanding
11.	Summarize the basic modes of operation in HiperLAN-2.	BTL 2	Understanding
12.	Infer about the protocol stack involved for Bluetooth communication.	BTL 3	Applying
13.	Draw the typical frame format of Wireless ATM.	BTL 4	Analyzing
14.	Interpret the elements of Bluetooth core protocol.	BTL 3	Applying
15.	Write about the power saving mechanism in Bluetooth.	BTL 1	Remembering
16.	How do IEEE 802.11 and Bluetooth respectively solve the hidden terminal problem?	BTL 2	Understanding
17.	Differentiate between piconet and scatternet.	BTL 4	Analyzing
18.	Summarize the requirements of handover.	BTL 2	Understanding
19.	Determine the need of 250 ohms resistor in HART protocol?	BTL 4	Analyzing
20.	Outline the challenges in 6LoWPAN.	BTL 2	Understanding

21.	What is meant by BRAN?		BTL 1	Remembering
22.	Write about Zigbee and mention its frequency range.		BTL 3	Applying
23.	List the three phases in channel access in HIPERLAN-1?		BTL 4	Analyzing
24.	Name any two MAC mechanism used in IEEE 802.11 WLAN system.		BTL 3	Applying
	Part – B			
1.	(i) What are the design goals and applications of wireless LAN. (ii) Menion the advantages and disadvantages of WLAN.	(6) (7)	BTL 1	Remembering
2.	Write a brief note on basic transmission technologies for WLANs.	(13)	BTL 1	Remembering
3.	Interpret the two network architectures of WLAN. Discuss them briefly with diagrams.	(13)	BTL 3	Applying
4.	Summarize three versions of PHY layer with the format of an IEEE 802.11 PHY frame.	(13)	BTL 2	Understanding
5.	Describe the basic structure of an IEEE 802.11 MAC data frame and also explain the special control packets.	(13)	BTL 4	Analyzing
6.	(i) List out the sevices provided by WATM. (ii) Sketch the generic WATM reference model.	(6) (7)	BTL 1	Remembering
7.	Assess the four different network types and layered Model of BRAN wireless access network.	(13)	BTL 3	Applying
8.	Analyze the basic structure and handover scenarios of HiperLAN2 with necessary diagrams.	(13)	BTL 4	Analyzing
9.	(i) State the functions covered by Link Manager Protocols. (ii) What are the three low power states in Bluetooth device.	(6) (7)	BTL 1	Remembering
10.	Elaborate how you would form a piconet and scatternet in Bluetooth with architecture diagram.	(13)	BTL 3	Applying
11.	Describe the steps involved in the security architecture of Bluetooth.	(13)	BTL 2	Understanding
12.	Infer the characteristics and architecture of IEEE 802.15.4 WPAN.	(13)	BTL 2	Understanding
13.	Construct the protocol architecture and categorize the data transfer types of Wireless Universal Serial Bus (WUSB).	(13)	BTL 3	Applying
14.	(i) Discuss about Zigbee Topologies with diagram. (ii) Draw and explain the architecture of Wireless HART.	(6) (7)	BTL 2	Understanding
15.	(i) Explain 6LoWPAN with architecture. (ii) Illustrate with an example the media access control mechanism of DCF methods adopted in IEEE 802.11 WLAN.	(7) (6)	BTL 2	Understanding

16.	Analyze HiperLAN in detail.	(13)	BTL 4	Analyzing
17.	Discuss IEEE 802.15.4 Protocol in detail	(13)	BTL 3	Applying
	Part – C			
1.	Illustrate the following IEEE 802.11 architecture with neat diagrams: (i) System architecture (ii) Protocol architecture	(7) (8)	BTL 3	Applying
2.	(i) Elaborate the PHY packet formats of IEEE 802.11b and IEEE 802.11a. (ii) Consider an OFDM system that uses 52 subcarriers out of which 48 are data sub-carriers and 4 are pilot sub carriers. System bandwidth is 20MHz and OFDM symbol duration including cyclic prefix with guard interval for ISI mitigation is 4μS. If code rate is ¾ and 64 QAM is used, what is the data rate?	(12) (3)	BTL 4	Analyzing
3.	Assess the core protocol elements in Bluetooth protocol stack with necessary diagrams.	(15)	BTL 2	Understanding
4.	Formulate the architecture and protocol stack of 6LoWPAN and explain the concept of header compression with an example.	(15)	BTL 3	Applying
5.	Explain the working principle of the following (i) WATM (ii) Bluetooth Architecture	(7) (8)	BTL 1	Remembering

UNIT II – MOBILE NETWORK LAYER

Introduction - Mobile IP: IP packet delivery, Agent discovery, Tunnelling and encapsulation, IPV6- Network layer in the internet- Mobile IP session initiation protocol - Mobile ad-hoc network: Routing: Destination Sequence distance vector, IoT: CoAP.

Part – A

Q. No	Questions	BTL	Competence
1.	Define mobile node.	BTL 1	Remembering
2.	What are the requirements of mobile IP?	BTL 1	Remembering
3.	Mention the different entities in mobile IP.	BTL 3	Applying
4.	What is meant by Care-of address in Mobile IP?	BTL 1	Remembering
5.	Differentiate between encapsulation and decapsulation.	BTL 3	Applying
6.	Interpret the importance of tunneling.	BTL 3	Applying
7.	Classify the agent discovery methods and write a note on it.	BTL 4	Analyzing

8.	In what way Foreign Agent help MN during its visit to foreign network?		BTL 2	Understanding
9.	Sketch the frame format of the IP-in-IP encapsulation.		BTL 1	Remembering
10.	Draw the frame format for registration request.		BTL 3	Applying
11.	Identify the four additional messages needed by the optimized mobile IP.		BTL 2	Understanding
12.	List the advantages of minimal encapsulation.		BTL 1	Remembering
13.	Assess the use of generic routing encapsulation.		BTL 4	Analyzing
14.	Examine the advantages and disadvantages of Hawaii architecture?		BTL 4	Analyzing
15.	Draw the basic architecture of cellular IP.		BTL 2	Understanding
16.	Summarize the salient features of IPv6.		BTL 4	Analyzing
17.	Name the responsibilities of network layer.		BTL 1	Remembering
18.	How can DHCP be used for mobility and support of mobile IP?		BTL 4	Analyzing
19.	Interpret the characteristics of MANET.		BTL 3	Applying
20.	Outline the functions of SIP.		BTL 2	Understanding
21.	Analyze about the things to be added to the distance vector algorithm.		BTL 4	Analyzing
22.	How is routing divided in DSR?		BTL 2	Understanding
23.	Which layer is CoAP in IoT?		BTL 2	Understanding
24.	Justify the need for special protocols to support micro mobility on the network layer.		BTL 3	Applying
	Part – B			
1.	Write a brief note on entities and terminology of mobile IP.	(13)	BTL 1	Remembering
2.	What is Mobile IP? Describe the Mobile IP protocol. Explain with a diagram, how IP packets are transmitted between nodes.	(13)	BTL 1	Remembering
3.	Mention the need of agent advertisement with packet format and explain the methods of operation.	(13)	BTL 4	Analyzing
4.	(i) Draw and explain the packet format of registration request and reply. (ii) Name the registration reply codes in mobile IP.	(6) (7)	BTL 1	Remembering
5.	Outline the mechanism of encapsulation and explain the methods of encapsulation.	(13)	BTL 3	Applying
6.	Explain the protocol fields and simplified header of Generic Routing Encapsulation (GRE).	(13)	BTL 3	Applying
7.	Sketch the basic structure of cellular IP and HAWAII architecture and explain in detail.	(13)	BTL 1	Remembering

8.	(i) Outline the characteristics of a client/server model of Dynamic Host Configuration Protocol. (ii) Explain the flow of DHCP client initialization process.	(6) (7)	BTL 2	Understanding
9.	Interpret the main idea of optimization and reverse tunneling.	(13)	BTL 3	Applying
10.	(i) Illustrate the header format of IPv6 with the diagram. (ii) Describe about the basic structure of hierarchical mobile IPv6.	(6) (7)	BTL 2	Understanding
11.	Elaborate the internet addresses and the IP adjunct protocol of the network layer in the internet.	(13)	BTL 4	Analyzing
12.	Mention the purpose of Session Initiation Protocol and explain how it works in a VoIP call?	(13)	BTL 3	Applying
13.	Examine how does destination sequence distance vector routing protocol is implemented in a network, explain with an example.	(13)	BTL 4	Analyzing
14.	Illustrate the distinct features of mobile ad hoc network and explain the relation to mobile IP and DHCP.	(13)	BTL 2	Understanding
15.	Summarize the main characteristics and architecture of Mobile Adhoc Networks with neat diagram.	(13)	BTL 2	Understanding
16.	Analyze the basic components used in IoT and outline the characteristics of IoT.	(13)	BTL 4	Analyzing
17.	Describe the architecture and functions of constrained application protocol.	(13)	BTL 4	Analyzing
	Part – C			
1.	Illustrate the mechanism of tunneling and encapsulation in mobile IP packet delivery with necessary diagrams.	(15)	BTL 3	Applying
2.	Imagine the following scenario. A Japanese and a German meet at a conference on Hawaii. Both want to use their laptops for exchanging data, both run mobile IP for mobility support. Explain the optimizations used in the mobile IP networks.	(15)	BTL 4	Analyzing
3.	Evaluate the process of route establishment and route maintenance in Destination Sequenced Distance Vector Routing protocol for ad hoc networks.	(15)	BTL 2	Understanding
4.	(i) With the IP header format explain the fields of the header used in the network layer in the internet. (ii)Analyze the schemes foe QoS support in the internet.	(8) (7)	BTL 4	Analyzing
5.	Explain the working principle of CoAP Protocol with architecture and message format.	(15)	BTL 1	Remembering

UNIT III – 3G OVERVIEW

Overview of UMTS Terrestrial Radio access network-UMTS Core network Architecture: 3GPP

Architecture, User equipment, UMTS Interfaces, Mobility Management for UMTS Network, CDMA2000 overview-Radio and Network components, Network structures, Radio Network, TD - CDMA, TD – SCDMA.

Part - A

Q. No	Questions	BTL	Competence
1.	What is UMTS?	BTL 1	Remembering
2.	Name the three main entities of the UMTS network.	BTL 2	Understanding
3.	How to handle the mobility in the UTRAN?	BTL 2	Understanding
4.	List the elements of UTRAN architecture.	BTL 3	Applying
5.	Define user equipment.	BTL 2	Understanding
6.	List the responsibilities of RNC in the RNS.	BTL 1	Remembering
7.	Draw the UTRAN logical architecture.	BTL 1	Remembering
8.	Summarize the characteristics of Control plane and User plane.	BTL 2	Understanding
9.	Outline the functions of 3G-GGSN.	BTL 3	Applying
10.	Analyze the use of DHCP.	BTL 4	Analyzing
11.	Interpret the bearer services in a UMTS layered architecture.	BTL 3	Applying
12.	Mention the need of firewall in a network.	BTL 1	Remembering
13.	Interpret the significance of 3rd Generation Partnership Project.	BTL 2	Understanding
14.	In what way the AAA server contributes to CDMA2000?	BTL 4	Analyzing
15.	What is the contribution of packet data serving node in cdma2000?	BTL 4	Analyzing
16.	Where do we use CDMA2000?	BTL 4	Analyzing
17.	Mention the major functions of PDSN.	BTL 1	Remembering
18.	Deduce the network structure of CDMA 2000.	BTL 4	Analyzing
19.	Name the main variants in configuring CDMA2000 network.	BTL 1	Remembering
20.	Identify the enhancements in radio network of CDMA2000 over the existing IS-95/J-STD-008.	BTL 3	Applying
21.	Summarize the concept of TD-CDMA.	BTL 3	Applying
22.	Outline the techniques used in TD-CDMA.	BTL 2	Understanding
23.	Assess the channel structure of TD-SCDMA.	BTL 4	Analyzing
24.	Write the list of elements used in TD-SCDMA.	BTL 3	Applying

Part - B

1.	Sketch the architecture of UTRAN with its elements and explain in detail.	(13)	BTL 1	Remembering
2.	Summarize the following in detail:		BTL 2	Understanding

	(i) UTRAN Interfaces, (ii) Transport Network Control plane, (iii) Transport Network User plane.	(5) (3) (5)		
3.	Illustrate the functional entities needed to support PS services and CS services in UMTS core network architecture.	(13)	BTL 3	Applying
4.	Draw the UMTS bearer service layered architecture and explain the service in detail.	(13)	BTL 1	Remembering
5.	Illustrate the logical architecture of the UMTS core network with an appropriate diagram.	(13)	BTL 3	Applying
6.	How mobility management is achieved in a UMTS network?	(13)	BTL 1	Remembering
7.	(i)Examine the objectives and operational principles of HSDPA. (ii)Describe the channels introduced in HSDPA.	(6) (7)	BTL 4	Analyzing
8.	Explain in detail about the overview and system architecture of CDMA 2000.	(13)	BTL 2	Understanding
9.	Compare the distribute network, regional network and centralized network.	(13)	BTL 4	Analyzing
10.	With the necessary diagram explain the radio network services of cdma2000.	(13)	BTL 4	Analyzing
11.	Describe the following in detail: (i)Packet Data Serving Node (PDSN) in cdma2000, (ii) Base Transceiver Station (BTS).	 (6) (7)	BTL 2	Understanding
12.	Examine the Network structure of CDMA 2000 and its three main variants.	(13)	BTL 3	Applying
13.	Determine how the forward channel and reverse channel allocation performed in cdma2000.	(13)	BTL 4	Analyzing
14.	Summarize the forward link features of CDMA2000 and write about the modulation schemes associated.	(13)	BTL 1	Remembering
15.	(i)Analyze power control mechanism used in cdma2000. (ii)Assess how Walsh code administration performed in cdma2000.	(7) (6)	BTL 3	Applying
16.	Generalize the fundamental architecture of a Time Division Code Division Multiple Access (TD-CDMA) and core network.	(13)	BTL 4	Analyzing
17.	Elaborate the architecture of Generic TD-SCDMA network.	(13)	BTL 2	Understanding
	Part – C			
1.	Explain the Radio Access Network Application Protocol and its functions.	(15)	BTL 1	Remembering
2.	With the UMS core network architecture analyze the functions in different areas.	(15)	BTL 4	Analyzing
3.	Describe the following CDMA 2000 Radio and Network components platforms: (i) Packet Data Serving Node (PDSN), (ii) Home Location Register (HLR), (iii) Base Transceiver Station (BTS).	 (5) (5) (5)	BTL 2	Understanding
4.	Illustrate the data rates and characteristics for Forward link RC and SR and Reverse link RC and SR.	(15)	BTL 3	Applying

5.	Assess the core network associated with TD-SCDMA wireless network for Release 5.	(15)	BTL 4	Analyzing

UNIT IV – INTERNETWORKING BETWEEN WLANS AND WWANS

Internetworking objectives and requirements, Schemes to connect WLANS and 3G Networks, Session Mobility, Internetworking Architecture for WLAN and GPRS, System Description, Local Multipoint Distribution Service, Multichannel Multipoint Distribution System.

Part - A

Q. No	Questions	BTL	Competence
1.	List the internetworking requirements.	BTL 1	Remembering
2.	Categorize the internetworking schemes.	BTL 4	Analyzing
3.	Interpret the gateway approach to internetwork WLANs and 3G networks.	BTL 2	Understanding
4.	Sketch the architecture of emulator approach.	BTL 2	Understanding
5.	Define session.	BTL 1	Remembering
6.	Name the generic approaches of internetworking.	BTL 1	Remembering
7.	Examine the trend followed in loose coupling.	BTL 4	Analyzing
8.	Write the functions of tight coupling in internetworking.	BTL 1	Remembering
9.	Show the tight coupling architecture between WLAN and GPRS.	BTL 3	Applying
10.	Outline the main function of GIF.	BTL 2	Understanding
11.	How system mobility is achieved?	BTL 1	Remembering
12.	Illustrate the implementation of the interfaces related to the mobile station.	BTL 3	Applying
13.	Mention the attributes of QoS in the uplink direction.	BTL 2	Understanding
14.	Interpret the significance of W_f interface.	BTL 3	Applying
15.	Summarize the features of LMDS.	BTL 2	Understanding
16.	Inspect the term multipoint in Local Multipoint Distribution Service.	BTL 4	Analyzing
17.	Identify the advantages of LMDS for broadband.	BTL 3	Applying
18.	Classify the present IEEE 802.16 standards.	BTL 3	Applying
19.	Infer the purpose of MMDS.	BTL 4	Analyzing
20.	Analyze the access schemes used in multichannel multipoint distribution system.	BTL 4	Analyzing
21.	Pointout the objectives of internetworking.	BTL 4	Analyzing
22.	Choose the specifications of LMDS.	BTL 3	Applying
23.	Discuss the enhancements carried out in UMTS.	BTL 2	Understanding

24.	Define the GPRS.			BTL 1	Remembering
Part - B					
1.	What are the objectives and the requirements for interworking between a wireless wide area network (WWAN) and a wireless local area network (WLAN)?		(13)	BTL 1	Remembering
2.	Draw the different architectures to connect WLANs and 3G Networks.		(13)	BTL 1	Remembering
3.	(i)	Explain about the tight coupling architecture in detail.	(5)	BTL 3	Applying
	(ii)	Describe the internetworking architecture between the IEEE 802.11 WLAN and GPRS.	(8)		
4.	(i)	Illustrate the tight coupling over Gb interface with necessary diagram.	(7)	BTL 3	Applying
	(ii)	Elaborate the approaches for transporting the GPRS signalling and user data.	(6)		
5.	Outline the WLAN adaptation function (WAF) in tight coupling architecture and explain with an appropriate diagram.		(13)	BTL 2	Understanding
6.	Summarize the GPRS interworking function (GIF)/routing area update (RAU) discovery procedure in tight coupling architecture.		(13)	BTL 2	Understanding
7.	Analyze the integration of IEEE 802.11 WLAN and GPRS using loose coupling.		(13)	BTL 4	Analyzing
8.	(i)	Brief the WLAN system architecture reusing the 3GPP subscription.	(6)	BTL 2	Understanding
	(ii)	How is authentication achieved in loose coupling architecture?	(7)		
9.	Examine the SIM based authentication over WLAN.		(13)	BTL 1	Remembering
10.	Compare tight and loose coupling architecture for interworking between IEEE 802.11 WLAN and GPRS.		(13)	BTL 4	Analyzing
11.	Describe the operating principle of local multipoint distribution system.		(13)	BTL 1	Remembering
12.	(i)	Write the significant features of LMDS.	(6)	BTL 1	Remembering
	(ii)	With an example explain the LMDS configuration.	(7)		
13.	(i)	Illustrate the MMDS system for digital video and wireless internet.	(8)	BTL 2	Understanding
	(ii)	Summarize the functional operation of MMDS.	(5)		
14.	Examine the multichannel multipoint distribution system (MMDS). Distinguish it with LMDS.		(13)	BTL 4	Analyzing
15.	Elaborate the details on the schemes to connect WLAN and 3G networks.		(13)	BTL 3	Applying

16.		How does the 3G GGSN/MSC differ from the GPRS architecture elements (3G GGSN/MSC)? What sort of enhancements are carried out in UMTS to meet out its specifications.	(13)	BTL 3	Applying
17.		Inspect the transaction-oriented TCP and TCP over 2.5G/3G wireless networks.	(13)	BTL 4	Analyzing
Part – C					
1.	Examine the tight coupling system configuration of WLAN-GPRS.		(15)	BTL 1	Remembering
2.	(i)	Elaborate the features of WLAN coupling points using the GPRS reference diagram.	(8)	BTL 3	Applying
	(ii)	Devise a system description for a tight coupling in a internetworking between WLAN and GPRS.	(7)		
3.	Summarize the different types of interface between WLAN and the GPRS.		(15)	BTL 2	Understanding
4.	(i)	Infer the different modulation schemes adopted in LMDS.	(5)	BTL 4	Analyzing
	(ii)	Examine the components of the LMDS architecture.	(10)		
5.		Analyze the local multipoint distribution service and multichannel multipoint distribution system.	(15)	BTL 4	Analyzing

UNIT V – 4G & BEYOND

Introduction – 4G vision – 4G features and challenges - Step towards 4G Networks - Why Integration, Benefits of Integration Applications of 4G – 4G Technologies: Multicarrier Modulation, Smart antenna techniques, IMS Architecture, LTE, Advanced Broadband Wireless Access and Services, MVNO.

Part - A

Q. No	Questions	BTL	Competence
1.	Write about 4G network.	BTL 1	Remembering
2.	How the vision of 4G system is stated?	BTL 1	Remembering
3.	Mention the challenges of 4G.	BTL 2	Understanding
4.	Is it possible to get 4G services on the 3G phone? Justify your answer.	BTL 4	Analyzing
5.	Which are all the technologies that can be applied in 4G services?	BTL 3	Applying
6.	Identify the techniques to improve network survivability in different layers and name the challenges faced by 4G.	BTL 3	Applying
7.	State the design challenges of 4G system.	BTL 1	Remembering
8.	Outline the new developments in 4G.	BTL 2	Understanding

9.	Select the challenges of 4G on system and service.		BTL 3	Applying
10.	Interpret the applications of 4G.		BTL 3	Applying
11.	Define multicarrier modulation.		BTL 1	Remembering
12.	Elaborate the term receiver diversity.		BTL 3	Applying
13.	List the advantages of multi carrier modulation over single carrier modulation schemes.		BTL 1	Remembering
14.	Classify the smart antenna techniques based on the number of transmitting and receiving antennas.		BTL 4	Analyzing
15.	Express the channel capacity of a MIMO system with M transmitting antennas and N receiving antennas.		BTL 3	Applying
16.	Summarize the features of IP Multimedia Subsystem.		BTL 2	Understanding
17.	Categorize the layers of IMS architecture.		BTL 4	Analyzing
18.	What are the key requirements of LTE?		BTL 1	Remembering
19.	Illustrate the issues in terminal mobility.		BTL 2	Understanding
20.	Analyze the working principle of MVNO.		BTL 4	Analyzing
21.	Compare 3G and 4G.		BTL 2	Understanding
22.	Infer the features of 4G services.		BTL 4	Analyzing
23.	Pointout the need for smart antenna.		BTL 4	Analyzing
24.	Distinguish SISO and SIMO systems.		BTL 2	Understanding
Part - B				
1.	What the 4G key challenges and mention the proposed solutions.	(13)	BTL 1	Remembering
2.	(i) Write short notes about the evolution of 4G system.	(6)	BTL 1	Remembering
	(ii) Describe the concept of “seamless connectivity” in 4G system and explain with suitable diagrams	(7)		
3.	(i) Identify the key parameters of 4G and compare it with 3G systems	(8)	BTL 3	Applying
	(ii) Illustrate the 4G vision with appropriate diagram.	(5)		
4.	Summarize the integration of 4G wireless technologies.	(13)	BTL 2	Understanding
5.	(i) Compare the performance of MC-CDMA with OFDM-TDMA.	(8)	BTL 1	Remembering
	(ii) List the different types of MCM techniques.	(5)		
6.	What is OFDM? Write the significance and its advantages in using in 4G wireless communication system.	(13)	BTL 1	Remembering
7.	Assess the smart antenna techniques and explain in	(13)	BTL 4	Analyzing

	detail.				
8.	(i)	Outline the features of IMS components.	(5)	BTL 2	Understanding
	(ii)	Explain the service architecture and its entities of IMS.	(8)		
9.	Illustrate the structure and compare the different smart antenna techniques used for wireless communication systems.		(13)	BTL 3	Applying
10.	Explain end to end architecture of LTE network.		(13)	BTL 2	Understanding
11.	Categorize the channels available in LTE network, explain each category elaborately.		(13)	BTL 4	Analyzing
12.	Analyze the functions and architecture of BWA.		(13)	BTL 4	Analyzing
13.	(i)	Elaborate the stix agent architecture.	(7)	BTL 3	Applying
	(ii)	Discuss the bidirectional bandwidth allocation in BWA	(6)		
14.	Determine the categories of MVNO and explain the architecture in detail.		(13)	BTL 4	Analyzing
15.	Summarize the 4G technologies MCM, and OFDM-MIMO system in detail.		(13)	BTL 2	Understanding
16.	Write a short note on 4G vision, applications of 4G, and multicarrier modulation.		(13)	BTL 1	Remembering
17.	Elaborate the long-term evaluation wireless systems.		(13)	BTL 3	Applying
Part – C					
1.	Summarize the technologies behind the 4G services and explain in detail.		(15)	BTL 2	Understanding
2.	Analyze the multicarrier modulation scheme adopted in 4G system, explain the working procedure of the scheme with necessary diagram.		(15)	BTL 4	Analyzing
3.	(i)	Infer about the user plane end-to-end protocol stack based on the protocol architecture of LTE.	(7)	BTL 4	Analyzing
	(ii)	Inspect the local services offered in LTE system	(8)		
4.	Explain about the effective distributed system as a management goal in broadband wireless access.		(15)	BTL 3	Applying
5.	Write your understanding on behavior of smart technique.		(15)	BTL 1	Remembering