Reg. No.															

Question Paper Code	13387

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Eighth Semester

Electronics and Communication Engineering

(Common to Computer and Communication Engineering)

20ECEL801 - 5G AND 6G WIRELESS COMMUNICATION SYSTEMS

Regulations - 2020

Duration: 3 Hours Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	*K – Level*	*CO*
1.	What does URLLC stand for in 5G? (a) Ultra-Reliable Low Latency Communication (b) Universal Radio Low Latency Communication (c) User Radio Long Lasting Connectivity (d) Ultra-Reliable Long Lasting Connectivity	*1*	*K1*	*CO1*
2.	What modulation technique is commonly used in 5G NR? (a) BPSK (b) QPSK (c) 256-QAM (d) FSK	*1*	*K1*	*CO1*
3.	What does SDN stand for in 5G architecture? (a) Software Defined Network (b) Secure Data Network (c) System Deployment Network (d) Signal Data Network	*1*	*K1*	*CO2*
4.	Which layer in 5G architecture is most affected by NFV? (a) Physical layer (b) Data link layer (c) Network layer (d) Application layer	*1*	*K1*	*CO2*
5.	Which of the following is NOT a multiple access technique used in 5G? (a) OFDMA (b) NOMA (c) TDMA (d) FDMA	*1*	*K1*	*CO3*
6.	Which filtering technique is most commonly used in FBMC? (a) Rectangular filtering (b) Pulse shaping filters (c) Gaussian filters (d) Butterworth filters	*1*	*K1*	*CO3*
7.	Which of the following is a key feature of Ultra-Dense Networks (UDNs)? (a) High frequency reuse (b) Large cell sizes (c) Low user density (d) Static resource allocation	*1*	*K1*	*CO4*
8.	What does V2X stand for in 5G? (a) Vehicle-to-Everything (b) Virtual-to-External (c) Very-fast Transmission Exchange (d) Voice-to-External	*1*	*K1*	*CO4*
9.	Which type of MIMO system is most commonly deployed in LTE? (a) 2x2 MIMO (b) 4x4 MIMO (c) 8x8 MIMO (d) 16x16 MIMO	*1*	*K1*	*CO5*
10.	Which modulation technique is widely used for VLC? (a) Visible light pulse modulation (b) Pulse amplitude modulation (c) Frequency modulation (d) Phase modulation	*1*	*K1*	*CO6*

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	List the 10 Pillars of 5G.	*2*	*K1*	*CO1*
12.	Differentiate the One-Trip Time (OTT) latency and Round-Trip Time (RTT) latency.	*2*	*K1*	*CO1*
13.	Show the relation between functional, logical, orchestration and physical architectures.	*2*	*K2*	*CO2*
14.	Draw the architecture of E-UTRAN.	*2*	*K2*	*CO2*
15.	Discuss about significance of Peak-to-Average Power Ratio (PAPR) in OFDM systems.	*2*	*K1*	*CO3*
16.	Draw the block diagram of UF-OFDM transceiver	*2*	*K1*	*CO3*

17.	Comparison between in SC-FDMA and OFDMA.	2	K2	CO4
18.	Recall the procedure of LTE / LTE-A RACH limitations.	2	K1	CO4
19.	How does SU-MIMO work in LTE?	2	K2	CO5
20.	Discuss about resource allocation critical in Massive MIMO systems.	2	K2	CO5
21.	Show that technologies are combined with IRS to enhance 6G networks.	2	K1	CO6
22.	Explain about VLC integrate with other wireless technologies in 6G.	2	K2	CO6

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain three generic 5G services and four main enablers of 5G services with suitable diagrams.	11	K2	CO1
		OR			
	b)	Illustrate the roadmap of the evolution of Mobile Communication towards 5G communications briefly.	11	K2	CO1
24.	a)	Explain in detail basics about RAN Architecture in 5G communication.	11	K2	CO2
		OR			
	b)	Summarize how the hardware technologies used for mmW systems briefly.	11	K2	CO2
25.	a)	Discuss in details about the Multi-carrier with filtering techniques in 5G radio access technology.	11	K3	CO3
		OR			
	b)	Explain in detail about the Sparse code multiple access (SCMA) techniques.	11	K2	CO3
26.	a)	Recall about the Non-orthogonal schemes for efficient multiple access techniques in 5G radio technologies.	11	K2	CO4
		OR			
	b)	Illustrate the radio-access considerations for Vehicle-to-Anything (V2X) communications and describe it.	11	K2	CO4
27.	a)	Explain in detail the Single-user MIMO and Multi-user MIMO in MIMO LTE system.	11	K2	CO5
		OR			
	b)	Explain briefly in Capacity of Massive MIMO and Pilot Design of Massive MIMO.	11	K2	CO5
28.	a)	Discuss details about the evolution toward 6G with different key performance indicators and key enabler technologies.	11	K3	CO6
		OR			
	b)	Explain in detail about the basics about machine learning for the 6G architecture.	11	K2	CO6