C Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U4201

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Professional Elective

Electronics and Communication Engineering

21ECV201 - ADVANCED WIRELESS TECHNIQUES

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1.	What is the value of co-channel interference reduction factor in a 7-cell reuse pattern?	CO2 -App	
2.	If a person's mobile phone was designed to work with 4G technology, what will happen when a 5G network is rolled out in their area?	CO2 App	
3.	What are Available bands at the mmWave and THz spectrum?	CO1 -U	
4.	How will 5G network use cases change the world?	CO2- App	
5.	How can we effectively manage the increased spectrum demands of 6G networks?	CO1 U	
6.	Compare 5G KPI and 6G KPI?	CO1 U	
7.	What role will 6G play in advancing industrial automation and smart manufacturing?	CO1 U	
8.	How will 6G improve remote healthcare and telemedicine applications?	CO3- App	
9.	What are the emerging trends in vehicular IoT that are expected to shape the future of transportation?	CO4 App	
10.	How does 6G technology enhance the scalability of massive IoT networks compared to 5G?	CO1 U	

PART – B (5 x 16= 80 Marks)

11.	(a)	Illustrate the technological breakthroughs which have made wireless/cellular systems technically and commercially viable.	CO1 U	(16)
		Or		
	(b)	Sketch UMTS Network Architecture and explain it in detail.	CO1 U	(16)

12.	(a)	How does Massive Machine-Type Communication (mMTC) in 5G address the challenges of connecting a vast number of IoT devices simultaneously, and what are the implications for smart cities, industrial automation, and other applications with high device density?	CO3 App	(16)
		Or		
	(b)	What are the major challenges faced during the standardization process of 5G, including issues related to interoperability, global harmonization, and the integration of new technologies, and how have these challenges been addressed?	CO3 App	(16)
13.	(a)	How will emerging technologies, such as 6G, quantum computing, and blockchain, contribute to the realization of Society 5.0?	CO2 App	(16)
		Or		
	(b)	What are the key performance indicators for real-time applications such as autonomous vehicles and remote surgery in 6G networks?	CO2 App	(16)
14.	(a)	What are the key technical enhancements that 6G brings to broadcasting communications compared to previous generations?	CO4 App	(16)
		Or		
	(b)	How can 6G support the seamless integration of wearable health devices and IoT sensors into e-health platforms?	CO4 App	(16)
15.	(a)	What challenges and solutions were identified in deploying 6G IoT for smart home applications? How did 6G technologies enhance the connectivity and functionality of smart home devices, such as smart appliances, security systems, and home automation controls?	CO6 Ana	(16)
		Or		
	(b)	In a healthcare scenario utilizing 6G IoT for remote patient monitoring, what were the key technical and logistical challenges encountered? How did 6G's capabilities, such as enhanced connectivity and ultra-reliable low-latency communication (URLLC), enhance patient care and remote diagnostics?	CO6 Ana	(16)