Reg. No.												

Question Paper Code	11583

06 JAN 2023

M.E. - DEGREE EXAMINATIONS, NOV/DEC 2022

Third Semester

M.E. - Communication Systems

20PCOPC301 - MILLIMETER WAVE COMMUNICATION

(Regulations 2020)

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level,CO
1.	Define millimeter wave.	*2,K1,CO1*
2.	Write any four application of millimeter wave.	*2,K1,CO1*
3.	List the different types of transistor used for millimeter wave.	*2,K1,CO2*
4.	State consumption factor theory.	*2,K1,CO2*
5.	Define on/off keying modulation	*2,K1,CO3*
6.	Why we need millimeter wave calibration?	*2,K1,CO3*
7.	How to achieve maximum gain in spatial diversity?	*2,K2,CO4*
8.	What are the protocols used for frequency allocation in MM waves?	*2,K1,CO4*
9.	Calculate the antenna beam width if diameter of the antenna is 0.6m.	*2,K3,CO6*
10.	Write the advantages of adaptive antenna array in mm wave.	*2,K1,CO6*

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	(i) Describe the large scale propagation modeling of millimeter wave.	*8,K2,CO1*
		(ii) Distinguish indoor and outdoor channel models.	*5,K2,CO1*
		OR	
	b)	Elaborate the challenges of millimeter wave implementation in 5G Networks.	*13,K2,CO1*
12.	a)	How to generate millimeter waves? Explain any two types of generation.	*13,K2,CO2*
		OR	
	b)	(i) Discuss shortly the architecture of ADC for wireless system.	*8,K2,CO2*
		(ii) Give the explanation of W band PLL selection in millimeter wave.	*5,K2,CO2*

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

13. a) (i) Why millimeter wave receiver preferred without local oscillator? *5,K2,CO3*
(ii) Describe On/off keying modulation scheme with block diagram. *8,K2,CO3*

OR

b) Calculate transmit EIRP, Free space path loss and signal to noise ratio. Transmitter power = 12 , Transmitter Gain = 38, Transmitter line loss = 0, Operating frequency = 60 GHz, Path length = 0.7 Km, Receiver Gain = 38, Receiver line loss = 0 , Receiver Noise figure= 10 , Band Width = 2000 , Temp (degreeC) = 25, Vapour attenuation = 0 dB/Km, Oxygen attenuation = 14.9 dB/Km, Rain attenuation = 9.175 dB/Km. *13,K3,CO3*

14. a) Explain the usage of multiple antennas in MIMO system. *13,K2,CO4*

OR

b) With the help of a neat block diagram, explain the working of OFDM modulation scheme for millimeter wave communication. *13,K2,CO4*

15. a) Explain the operation of (i) Antenna on chip (ii) Antenna in package using diagrams. *13,K2,CO6*

OR

b) Elaborate in detail device to device communication in 5G networks. *13,K2,CO6*

PART - C (1 × 15 = 15 Marks)

16. a) Elaborate in detail the spatial multiplexing and spatial diversity of antenna arrays with relevant sketch. *15,K2,CO5*

OR

b) Distinguish temporal and frequency diversity in MIMO system. *15,K2,CO5*