Reg. No.												

Question Paper Code	13029

M.E. / M.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024

Third Semester

M.E. - Communication Systems

20PCOEL306 - RADIO OVER FIBER TECHNOLOGIES

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	List the benefits of radio over fiber technology.	2	K1	CO1
2.	Differentiate wideband matching and resistive matching.	2	K2	CO1
3.	Compare the data transmission rates of coaxial and fiber optic cables for long-distance communication.	2	K2	CO2
4.	How does subcarrier multiplexing enhance the capacity of optical fiber communication systems?	2	K1	CO2
5.	What are the key factors influencing the analog modulation bandwidth of a laser diode?	2	K1	CO3
6.	Interpret the rate equation of laser diode and the steady state solution.	2	K2	CO3
7.	What is the concept of micro diversity and how it improves the reliability of RoF systems?	2	K1	CO5
8.	Outline the key features and improvements introduced by 3G cellular systems compared to earlier generations.	2	K2	CO5
9.	What is photonic TDMA?	2	K1	CO6
10.	What are the two types of CDMA used for fiber optic radio highway networks?	2	K1	CO6

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

			Marks	K – Level	CO
11.	a) i)	Explain the principles used in the radio over fiber technology.	7	K2	CO1
	ii)	Demonstrate the various parameters that affect the RF link efficiency of directly modulated optical link.	6	K2	CO1
		OR			
	b)	Derive the expression for the noise figure including all possible noise sources and draw the schematic of a direct modulated passive optical microwave link.	13	K2	CO1
12.	a)	Derive the expression for CNR for the system used in fiber optic transmission of 64-QAM signals.	13	K2	CO2
		OR			

	b)	With diagram explain the laser Nonlinearity compensation for Radio subcarrier multiplexed fiber optic transmission systems.	*13*	*K2*	*CO2*
13.	a) i)	Explain the working principle of laser diode driver.	*8*	*K2*	*CO3*
	ii)	Outline the effect of laser diode noise on the performance of analog optical link.	*5*	*K2*	*CO3*
		OR			
	b)	Demonstrate the threshold condition for lasing and Derive the laser diode rate equations.	*13*	*K2*	*CO3*
14.	a)	Explain the radio over fiber application in UMTS systems with neat diagram.	*13*	*K2*	*CO5*
		OR			
	b) i)	Infer the simple simulation model of WCDMA RoF system.	*7*	*K2*	*CO5*
	ii)	Describe spectral efficiency and power level.	*6*	*K2*	*CO5*
15.	a)	Explain the principle used in the photonic TDMA with block diagram.	*13*	*K2*	*CO6*
		OR			
	b) i)	Explain in detail about the conventional photonic CDMA methods.	*7*	*K2*	*CO6*
	ii)	Compare and contrast the types of access control in the analysis of radio burst collision.	*6*	*K2*	*CO6*

PART - C (1 × 15 = 15 Marks)

16.	a)	Explain the applications of radio over fiber for 5G and home area network with neat block diagram and working of each component involving in the radio over fiber network.	*15*	*K2*	*CO4*
		OR			
	b)	Describe in detail about fiber-feeder microcellular network for mobile communication systems.	*15*	*K2*	*CO4*