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

Question Paper Code: U9476

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

Open Elective

Electronics and Communication Engineering

21UEC976- BASICS OF COMMUNICATION SYSTEM

(Regulations 2021)

(Common to All Branches)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5Marks)

1. In an electrical communication system, the speech or data to be transmitted is called CO1-U

   (a) Carrier (b) Noise (c) Message Signal (d) Filter

2. Phase modulation varies the ____ of the carrier wave. CO1-U

   (a) Amplitude (b) Frequency (c) Phase (d)Wavelength

3. The process of assigning discrete values to sampled amplitudes is _____. CO1-U

   (a) Sampling (b) Coding (c) Quantization (d) Filtering

4. The phenomenon that causes VHF and UHF waves to bend and follow the earth's curvature is _____. CO1-U

   (a) Refraction (b) Reflection (c) Diffraction (d) Duct propagation

5. In Optical Fiber Communication, which block converts light back into electrical signals? CO1-U

   (a) Transmitter (b) Photodiode Receiver (c) Multiplexer (d) Repeater

PART – B (5 x 3= 15 Marks)

6. What is the main objective of a communication system? CO1-U

7. Identify the significance of modulation index in AM. CO1-U

8. Apply the Nyquist sampling theorem to find the minimum sampling frequency for a 3 kHz signal. CO3-App

9. Why does tropospheric scatter propagation allow communication beyond the line of sight? CO1-U

10. Interpret how optical fiber minimizes signal attenuation over long distances. CO1-U

PART – C (5 x 16= 80 Marks)

11.	(a)	Explain the role of transducers in a communication system and illustrate with examples how they convert physical signals into electrical signals and vice versa.	CO1-U	(16)
		Or		
	(b)	Describe the challenges of long-distance communication systems and explain how repeaters and amplifiers help overcome these challenges to ensure signal integrity.	CO1-U	(16)
12.	(a)	How can you apply the principles of modulation to design a simple amplitude modulator circuit for a 1 kHz audio signal with a 100 kHz carrier, and what essential components are needed to achieve modulation?	CO2-App	(16)
		Or		
	(b)	Apply the concept of modulation index to determine the percentage modulation for an AM wave when maximum and minimum envelope voltages are specified, and explain the significance of your result?	CO2-App	(16)
13.	(a)	Explain Quadrature Phase Shift Keying (QPSK) and its concept to justify how it improves bandwidth efficiency compared to BPSK?	CO1-U	(16)
		Or		
	(b)	Describe Pulse Code Modulation (PCM) with a block diagram of its transmitter.	CO1-U	(16)
14.	(a)	Explain the mechanisms of ground wave propagation. Discuss its advantages, limitations, and frequency range of operation.	CO1-U	(16)
		Or		
	(b)	Explain the factors that affect radio wave propagation in the ionosphere and troposphere with neat diagrams.	CO1-U	(16)
15.	(a)	Analyze the impact of selecting different frequency bands such as L, Ku, and Ka on satellite communication system design. Compare these bands in terms of atmospheric attenuation, antenna size, cost, and service quality. Based on your analysis, justify which band is most suitable for specific applications and explain why.	CO5-Ana	(16)
		Or		
	(b)	Analyze the challenges in mobile communication networks caused by handoff and interference during cell transitions, compare their effects on network performance, and justify the techniques that can be used to minimize these issues?	CO5-Ana	(16)