K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:VI
Class:TY	Program:B.Tech
Branch Code:ELE	Pattern:2022
Name of Course:Communication Systems	Course Code:ELE223017
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 02 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

		Marks	**CO**
Question No. 1			
1a)	Classify signals with suitable examples and explain how Fourier Series and Fourier Transform help in analyzing electrical signals	(6)	CO1
Question No. 2			
2a)	Define power spectral density (PSD) and essential bandwidth. Explain how PSD is used to determine the bandwidth required for transmitting a signal without major distortion	(6)	CO 2
Question No. 3			
3a)	Differentiate between Frequency Modulation (FM) and Phase Modulation (PM) based on their principle, bandwidth, and applications.	(8)	CO 3
	OR		
3b)	Describe how a narrowband signal is generated and explain the process with the help of a schematic diagram	(8)	CO 3
3c)	Explain the terms Phase Modulation (PM) and Frequency Modulation (FM). Also discuss the reasons why FM is generally preferred over PM in communication systems.	(8)	CO 3
	OR		
3d)	Explain the process of Amplitude Modulation (AM). Derive the expression for an AM wave and explain the significance of the modulation index.	(8)	CO 3
Question No. 4			
4a)	What are Nyquist Criteria and Aliasing? Explain Uniform and Non-uniform quantization	(8)	CO1
	OR		
4b)	Explain how Time Division Multiplexing (TDM) works. Draw its block diagram, mention its applications, and show how two signals can be multiplexed using TDM	(8)	CO1
4c)	Describe the concept of Delta Modulation (DM) and explain its main advantages	(8)	CO 3
	OR		

4d)	Explain the process of sampling and A/D conversion. Derive the Nyquist rate and explain its significance in signal reconstruction.	(8)	CO1

Question No. 5

5a)	Explain the principle of Amplitude Shift Keying (ASK). Derive the expression for an ASK signal and discuss its advantages and disadvantages	(8)	CO 3

OR

5b)	Describe the concept of Phase Shift Keying (PSK). Explain how this modulation technique works and highlight its basic characteristics	(8)	CO 3
5c)	Explain the concept of Differential Phase Shift Keying (DPSK). Describe how this modulation technique works and highlight its basic characteristics	(8)	CO 3

OR

5d)	Explain Frequency Shift Keying (FSK) with its modulator & demodulator circuit	(8)	CO 3

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