BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH **SEMESTER : V**
BRANCH: EEE **SESSION : MO/2025**

SUBJECT: EE417 FUNDAMENTALS OF COMMUNICATION SYSTEM

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	State and prove the frequency shifting property of the Fourier transform.	[5]	CO1	BL2
Q.1(b)	$x(t) = \begin{cases} A, & \lvert t \rvert \leq \tau/2 \\ 0, & otherwise \end{cases}$ Determine and plot the magnitude spectra of x(t).	[5]	CO1	BL4
Q.2(a)	Define modulation indexfor amplitude modulation scheme. A carrier signal $A_c cos\omega_c t$ is amplitude modulated by a message signal $A_m cos\omega_m t$, where, Am < Ac. (i) Write down the expression for the modulated signal. (ii) Draw the modulated signal in the time and frequency domains.	[5]	CO2	BL5
Q.2(b)	It is found that a radio transmitter is radiating a total power of 100 kW. When the modulation index is 0.8, what is the carrier power being radiated by the transmitter? What is the sideband power?	[5]	CO2	BL4
Q.3(a)	Explain the properties of angle modulation.	[5]	CO3	BL2
Q.3(b)	A 20 MHz carrier is frequency modulated by a sinusoidal signal such that the maximum frequency deviation is 100 kHz. Determine the modulation index and the approximate bandwidth of the FM signal if the modulating signal is (i) 1 kHz, (b) 100 kHz, (c) 500 kHz.	[5]	CO3	BL5
Q.4(a)	Discuss the drawbacks associated with Delta modulation.	[5]	CO4	BL2
Q.4(b)	Compare BPSK and BFSK and draw the waveforms for the sequence 10110010 for BASK, BPSK, BFSK.	[5]	CO4	BL3
Q.5(a)	Explain equivalent noise temperature and noise figure.	[5]	CO5	BL2
Q.5(b)	An amplifier has a bandwidth of 500kHz and an input resistance of 50 ohms. When 0.5μV input signal level is applied to the amplifier input under matched conditions, the SNR =0dB. Determine the noise figure of the amplifier.	[5]	CO5	BL4

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