BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2025)

CLASS: B. Tech **SEMESTER : V**
BRANCH: EEE **SESSION : MO/2025**

SUBJECT: EE417 FUNDAMENTALS OF COMMUNICATION SYSTEM

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	(a) Identify the Power signal and energy signal from the following: i. $x(t) = Ae^{-t}$ for t > 0 and = 0 for t <0 ii. $x(t) = \cos 2\pi f_0 t$ *iii.* $x(t) = tu(t)$ iv. $x(t) = Ae^{j\omega_0 t}$	[2]	CO1	2
Q.1(b)	Find the complex Fourier coefficient of a periodic train of rectangular pulses of duration T amplitude A and period T_0. Assuming duty cycle =0.2 plot the amplitude spectrum.	[3]	CO1	3
Q.2(a)	State and prove the time shifting property of the Fourier Transform.	[2]	CO1	2
Q.2(b)	Find the total area under a sinc pulse given by $Asinc(2Wt)$.	[3]	CO1	3
Q.3(a)	Find Fourier transform and draw spectrum of (i) $e^{j2\pi f_C t}$ (ii) $cos2\pi f_C t$	[2]	CO1	3
Q.3(b)	What is modulation? Why is it needed?	[3]	CO1	3
Q.4(a)	Discuss the limitations of conventional amplitude modulation scheme.	[2]	CO2	2
Q.4(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 power in each sideband?	[3]	CO2	4
Q.5(a)	What are the advantages of single side band modulation over conventional amplitude modulation?	[2]	CO2	2
Q.5(b)	An SSB transmitter operates at a frequency of 4.2 MHz. The voice frequency range is 300 to 3400 Hz. Calculate the upper and lower sideband ranges.	[3]	CO2	4

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