Registration No.: | | | | | | | | | | |

Total Number of Pages: 02 **Course: B.Tech**
Sub_Code: REE5D002

5th Semester Back Examination: 2025-26
SUBJECT: Fundamentals of Communication
BRANCH(S): EEE
Time: 3 Hours
Max Marks: 100
Q.Code: U220

Answer Question No.1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right-hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) Mention the conditions for distortionless transmission.
b) Define carrier and sideband.
c) Define signal-to-noise ratio (SNR).
d) What is the bandwidth of FM signal according to Carson's rule?
e) What is discriminator?
f) Differentiate between narrowband FM and wideband FM.
g) Define VSB signals.
h) Mention two advantages of superheterodyne receiver.
i) What is the function of an RF amplifier?
j) State the principle of square-law modulator.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) Explain the basic elements of a communication system with a neat block diagram.
b) Derive the expression for amplitude modulated (AM) wave and explain its components.
c) Compare DSB-FC, DSB-SC, and SSB modulation techniques.
d) Write short notes on different types of distortions in communication systems.
e) Derive the expression for instantaneous frequency in FM.
f) Explain the relationship between FM and PM with equations.
g) Explain the effect of modulation index on FM signal spectrum.
h) Discuss the basic principle of frequency modulation (FM) and phase modulation (PM).
i) Draw and explain the block diagram of an AM radio transmitter.
j) What is the role of a mixer and local oscillator in a radio receiver?
k) Explain the process of noise generation and its classification.
l) Explain the threshold effect in FM receivers.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3	**a)**	Describe Quadrature Amplitude Modulation (QAM) with block diagram.	**(8)**
	b)	Explain the principle and working of Vestigial Sideband modulation and demodulation.	(**8**)
Q4	**a)**	Describe the principle of FM demodulation using a Phase Locked Loop (PLL).	**(8)**
	b)	Explain the operation of a balanced slope detector and ratio detector with diagrams.	(**8**)
Q5	**a)**	Explain the working of a superheterodyne receiver with block diagram.	**(8)**
	b)	Discuss system noise calculation for AM, FM, and SSB receivers.	**(8)**
Q6	**a)**	Explain the concept of Automatic Volume Control (AVC) in receivers.	**(8)**
	b)	Discuss the working of an envelope detector for AM signal demodulation.	(**8**)