

May 2023

B.Tech. (EEIOT) IV SEMESTER

Subject: Principle of Communication Systems(EEN-401)

Time: 3 Hours

Max. Marks:75

- Instructions:**
1. It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.
 2. Answer any four questions from Part -B in detail.
 3. Different sub-parts of a question are to be attempted adjacent to each other.

PART -A

- Q1 (a) How is the height of antenna related to modulation? Also explain how modulation helps in reducing the height of antenna. (1.5)
- (b) Determine the power content of each of sidebands and of the carrier of an AM signal that has a percent modulation of 75% and contains 1500W of total power. (1.5)
- (c) Define internal noise. How can you classify internal noise? (1.5)
- (d) The maximum deviation allowed in an FM broadcast system is 75kHz. If the modulating signal is single tone sinusoidal of 8kHz. Determine the bandwidth of FM signal. (1.5)
- (e) What is meant by term significant sidebands in FM? (1.5)
- (f) Differentiate between low level and high level amplitude modulation. (1.5)
- (g) Distinguish between uniform and nonuniform quantization. (1.5)
- (h) Define quantization. What is the relation between numbers of quantization levels and number of bits per word? (1.5)
- (i) Differentiate between BPSK and M-ary PSK. (1.5)
- (j) What do you mean by noise temperature? (1.5)

PART -B

- Q2 (a) Differentiate between the following: (8)
- (i) Continuous time signals and discrete time signals
 - (ii) Even and odd signals
 - (iii) Periodic and non-periodic signals
 - (iv) Analog and digital signals
- (b) What do you mean by amplitude modulation? Explain it with proper waveforms. Also find mathematical expression of AM wave. (7)
- Q3 (a) Explain the operation of square law modulator which generates AM wave. Prove with the help of derivation that it generates the AM at its output. (7)
- (b) Derive the expression for DSBSC wave. Draw circuit diagram and discuss (8)

working of balanced modulator for generation of DSBSC wave.

- Q4 Explain the Armstrong method of generation of FM with neat block diagram and phasor diagram. (7)
- (a) and phasor diagram.
- (b) Explain the difference between narrow band FM and wideband FM. Derive an expression for narrowband FM. Also give statement of carson's rule. (8)
- Q5 (a) State and prove sampling theorem. Determine the nyquist rate and nyquist interval for the signal: $\sin^2 c(100\pi t)$. (7)
- (b) What do you mean by pulse modulation? Explain their types with waveforms. Also explain one method of generation of PWM and PPM. (8)
- Q6 (a) Explain delta modulation. What is the slope overload distortion and granular noise in delta modulation? How it is removed in adaptive delta modulation? (7)
- (b) Define QPSK. Draw and explain block diagram of QPSK generation and detection. (8)
- Q7 Write short notes on following: (5*3 =15)
- (i) ASK and FSK
 - (ii) Calculation of noise figure
 - (iii) TDM
