

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2023

Subject Code:3163206

Date:02-12-2023

Subject Name:Analog and Digital Communication

Time:02:30 PM TO 05:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1**
- (a) What is single sideband suppressed carrier modulation? **03**
 - (b) Explain the need for modulation in communication systems. **04**
 - (c) Derive mathematical representation of Amplitude Modulation and explain the signification of Modulation Index with necessary waveforms **07**

- Q.2**
- (a) What are the salient features of broadcast radio receivers? **03**
 - (b) Draw the superheterodyne receiver and explain the operation of working. **04**
 - (c) What is a noise figure? Derive the expression of noise figure for cascaded stages of amplifiers. **07**

OR

- (c) Explain the classification of the noise and drive the expression for noise voltage. **07**

- Q.3**
- (a) What do you mean by the probability of error for digital modulation signals? **03**
 - (b) Explain the ASK modulation technique with suitable waveforms. **04**
 - (c) Explain the PCM modulation technique and also mention the significance of quantization. **07**

OR

- Q.3**
- (a) Explain the FSK modulation technique with suitable waveforms. **03**
 - (b) Draw FSK and PSK waveform for the given binary data: 1001001101011001. **04**
 - (c) What is delta modulation? Explain the generation method with suitable diagrams and waveforms. **07**

- Q.4**
- (a) What is the difference between Coherent and Non-Coherent Detection techniques **03**
 - (b) What is coherent demodulation of binary ASK? **04**
 - (c) What is an AM transmitter? Draw the block diagram of the AM transmitter and explain each block. **07**

OR

- Q.4**
- (a) What is the bandwidth of the QPSK signal? **03**
 - (b) Explain the non-coherent FSK detection technique. **04**
 - (c) What is an FM receiver? Draw the block TRF receiver and explain each block **07**

- Q.5** (a) Explain the importance of Pre-emphasis and De-emphasis circuits in FM. Sketch a typical Pre-emphasis and De-emphasis circuit **03**
- (b) Explain CDMA in detail. **04**
- (c) For the FM System, the modulating frequency is 4 KHz and the maximum frequency deviation is 20 KHz. Calculate modulation index β and bandwidth of the system using Carson's Rule. **07**

OR

- Q.5** (a) Give a comparison of the Wideband and the Narrowband FM. **03**
- (b) Draw a Block diagram of frequency hopping spread spectrum (FHSS) system and Explain Frequency Hopping with necessary waveforms **04**
- (c) Explain Armstrong's method of FM generation with a neat diagram. **07**

.....