

Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI EXAMINATION – SUMMER 2025

Subject Code:3163206

Date:20-05-2025

Subject Name:Analog and Digital Communication

Time:10:30 AM TO 01:00 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) Explain the importance of modulation in communication system. **03**
(b) A carrier wave of 500 watts is subjected to 100% amplitude modulation. **04**
Determine:
(i) power in sidebands.
(ii) power of the modulated wave.
(c) Explain various types of noises in the communication system and derive the relation between noise temperature and noise figure. **07**
- Q.2** (a) Define modulation index in AM modulation. What will be the effect on AM transmitted signal if the modulation index in 1 or 100%. **03**
(b) Explain Pre-emphasis and de-emphasys in FM System. **04**
(c) Define Amplitude Modulation. And Derive the expression of Amplitude modulation. **07**
- OR**
- (c) What is DSB-SC? Explain it with the help of a block diagram of the modulator and demodulator **07**
- Q.3** (a) Differentiate between FM and PM with mathematical expression. **03**
(b) Determine the bandwidth required for an FM signal having frequency 2KHz and a maximum Deviation 10KHz **04**
(c) Describe the methods used to generate SSB modulation signal. Explain any one method in detail. **07**
- OR**
- Q.3** (a) Explain PPM with diagram. **03**
(b) Differentiate between PAM and PWM. **04**
(c) Explain FM Receiver with neat and clean diagram. **07**
- Q.4** (a) Explain with block diagram the Basic Radio communication channel with transmitter and receiver. **03**
(b) Explain Differential PCM. **04**
(c) Explain super-hetrodyne receiver with neat and clean diagram. **07**
- OR**
- Q.4** (a) Differentiate between Analog and Digital Modulation. **03**
(b) Draw the frequency spectrum of sinusoidal FM. **04**
(c) Define the role of Quantization in communication system. Explain PCM. **07**
- Q.5** (a) Write short note on latest trends in Digital Communication. **03**
(b) What is the effect of transmitted power in case of DSB and SSB-SC, explain with numerical calculation. **04**
(c) Compare different digital modulation techniques with example. **07**

OR

- Q.5** (a) Define Noise Figure(F). Explain its effect taking various cases ($F=1, F>1$ & $F<1$) in communication system. **03**
- (b) Explain CDMA. **04**
- (c) What is the difference between Coherent and Non-Coherent Detection techniques? Discuss Coherent detection techniques of FSK signal. **07**
