

Enrolment No./Seat No\_\_\_\_\_

## GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:3163206

Date:15-05-2024

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.

	MARKS
<b>Q.1</b> (a) Explain Elements of communication system with diagram.	<b>03</b>
(b) Explain Need of Modulation in details.	<b>04</b>
(c) State Friss Formula for overall Noise Factor of amplifiers in cascade and Using Friss Formula, Find Overall Noise Figure of three stage cascaded amplifier, each stage having a power gain of 10 dB and noise figure of 5 dB.	<b>07</b>
<b>Q.2</b> (a) What do you mean by VSB Modulation and Why it is used?	<b>03</b>
(b) Explain various forms of External noise in brief.	<b>04</b>
(c) Derive mathematical representation of AM and Explain signification of Modulation Index with necessary waveforms.	<b>07</b>
<b>OR</b>	
(c) Discuss Noise factor. Derive expression for noise factor of amplifier connected in cascade.	<b>07</b>
<b>Q.3</b> (a) For FM System, the modulating frequency is 10 KHz and maximum deviation is 75 KHz Calculate bandwidth of system using Carson's Rule.	<b>03</b>
(b) Give comparison of wideband and narrowband FM.	<b>04</b>
(c) Explain Armstrong method of FM generation with neat diagram.	<b>07</b>
<b>OR</b>	
<b>Q.3</b> (a) The antenna current of an AM transmitter is 8 A for an unmodulated carrier but it increases to 8.93 A when the carrier is modulated by a single sine wave. Find the percentage modulation. Determine the antenna current when the percentage modulation changes to 0.8.	<b>03</b>
(b) Derive the formula for the instantaneous value of an FM voltage and define the modulation index. And draw the waveforms of information signal and its FM modulated signal.	<b>04</b>
(c) Explain the importance of Pre-emphasis and De-emphasis circuits in FM. Sketch a typical Pre-emphasis and De-emphasis circuit.	<b>07</b>
<b>Q.4</b> (a) Describe pulse width modulation. With neat sketch explain generation of PWM.	<b>03</b>
(b) Write a short note on Full carriers AM transmitters.	<b>04</b>
(c) For a receiver with IF and RF frequency of 455 KHz & 950 KHz respectively determine: (i) local oscillator frequency (ii) image frequency (iii) image frequency rejection ratio. take $Q=70$ .	<b>07</b>

**OR**

**OR**

- Q.4** (a) Write short note on latest trends in digital communication. **03**  
(b) Explain Pulse Code Modulation with necessary waveforms. **04**  
(c) For Binary data: 1110100110110101 draw ASK, FSK and PSK waveform. **07**  
(Assume suitable data).

- Q.5** (a) Explain FSK demodulation. **03**  
(b) State the Advantages and Application of Spread Spectrum Communication. **04**  
(c) Draw the block diagram of Tuned Radio Frequency (TRF) Receiver and explain its operation. Describe the problems in TRF receiver. **07**

**OR**

- Q.5** (a) Explain ASK demodulation. **03**  
(b) Give comparison of wideband and narrowband FM. **04**  
(c) Explain working principle of delta modulation with help of block diagram. **07**  
What are the problems associated with delta modulation?

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