GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– VI (New) EXAMINATION – WINTER 2019

Subject Code: 2163206   **Date: 09/12/2019**

Subject Name: Analog and Digital Communication (ICT)

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.

			MARKS
Q.1	**(a)**	Explain General Communication System with Block Diagram.	**03**
	(b)	Derive Mathematical Representation of Amplitude Modulation and Explain Signification of Modulation Index with necessary Waveforms.	**04**
	(c)	Write a Short note on Super Heterodyne Receiver.	**07**
Q.2	**(a)**	Explain CDMA in brief.	**03**
	(b)	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	**04**
	(c)	What are the different methods for Generation of FM Signals? Explain any one method in detail.	**07**
		OR	
	(c)	Explain the importance of Pre-emphasis and De-emphasis circuits in FM. Sketch a typical Pre-emphasis and De-emphasis circuit.	**07**
Q.3	**(a)**	Write a short note on Full carriers AM transmitters	**03**
	(b)	An Amplifier operating over the Frequency Range from 19 MHz to 22 MHz has a 5 KΩ input resistor. Using thermal agitation noise formula, find RMS Noise Voltage and Noise Power at the input to this amplifier if the ambient temperature is 29°C. Boltzmann's Constant k=1.38 x 10^{-23} J/K	**04**
	(c)	Draw Block diagram of frequency hopping spread spectrum (FHSS) system and Explain Frequency Hopping with necessary waveforms.	**07**
		OR	
Q.3	**(a)**	Write short note on latest trends in Digital Communication	**03**
	(b)	Give comparison of Wideband and Narrowband FM.	**04**
	(c)	An AM modulating signal 5*Sin (2π x 200t) is used to modulate a carrier signal 25*Sin (2π x 25000t). Find modulation index, percentage modulation, frequencies of sideband components and their amplitude. Draw the spectrum of AM wave.	**07**
Q.4	**(a)**	Write a short note on Radio Communication with neat Sketch.	**03**
	(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.	**04**
	(c)	Enlist and compare different digital modulation techniques.	**07**
		OR	

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Q.4 **(a)** For FM System, the modulating frequency is 10 KHz and maximum deviation is 75 KHz Calculate bandwidth of system using Carson's Rule. **03**

(b) Introduce pulse width modulation. With neat sketch explain generation of PWM. **04**

(c) Explain working principle of Delta modulation with help of block diagram. What are the problems associated with Delta Modulation? **07**

Q.5 **(a)** What do you mean by VSB Modulation and Why it is used? **03**

(b) For Binary data: 1101001100111001 Draw ASK, FSK and PSK waveform. **04**

(c) Compare Amplitude Modulation, Frequency Modulation and Phase Modulation. **07**

OR

Q.5 **(a)** State the Advantages and Application of Spread Spectrum Communication. **03**

(b) Explain Pulse Code Modulation with necessary waveforms. **04**

(c) What is the difference between Coherent and Non-Coherent Detection techniques? Discuss Coherent Detection of FSK signal. **07**

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