## **Digital Communication**

## Unit-1

## **Question bank**

## In Assignment-1 You are required to write the answers of Que. No. 1,3,5,8,10,11,13,14,15,19,21,22,24,25,26.

Sr.No	Question	Marks
1	What are the advantages and disadvantages of digital communication compared to analog communication?	4
2	With a neat block diagram explain the various elements of a digital communication system.	6
3	State and prove sampling theorem for lowpass signals.	6
4	Distinguish between instantaneous sampling, natural sampling and flat top sampling.	3
5	The input Modulating signal having frequency of 100Hz is sampled at rate of 150Hz, 200Hz and 250Hz. Draw the time domain and frequency domain output signal.	5
6	What is Interpolation process? Explain the Aliasing effect by sketching the spectrum of under sampled signal.	5
7	Explain the concept of time division multiplexing in T1 carrier system by drawing a relevant block diagram.	6
8	<ul> <li>Twenty four voice signals are sampled uniformly and then time division multiplexed. The highest frequency component for each voice signal is 3.4 kHz.</li> <li>a. If the signals are pulse amplitude modulated using Nyquist rate sampling what is the minimum channel bandwidth required?</li> <li>b. If the signals are pulse code modulated with as 8 bit encoder, what is the sampling rate? the bit rate of system is 1.5 * bits/sec.</li> </ul>	6
9	With the help of neat diagrams explain the transmitter and receiver of pulse code modulation. Explain uniform quantization.	6
10	Derive the relations for bit rate and transmission bandwidth in PCM system.	4
11	Derive the expression for signal to quantization noise ratio for PCM system that	6

	employs linear quantization techniques. Assume that input to the PCM system is	
	a sinusoidal signal.	
12	What is the necessity of nonuniform quantization and explain u-law companding	6
12	Sketch the input-output characteristic of compressor and expander.	v
13	Explain delta modulation in detail with block diagram of Transmitter &	6
	Receiver.	
14	Explain Adaptive Delta modulation and compare its performance with Delta	6
	modulation.	
	What is slope overload distortion and granular noise in Delta modulation and	
	now it is removed in Adaptive Delta modulation?	
15	Explain DPCM with block diagram of Transmitter & Receiver. How is it	6
	different from PCM?	
16	Compare PCM_DM_ADM and DPCM	8
10		0
17	What is line coding technique? Explain various line codes like unipolar RZ and	6
	NRZ, Polar RZ and NRZ.	
18	Explain desirable properties of line codes in detail.	4
10		6
19	Explain Intersymbol Interference (ISI)? How it is avoided with help of Nyquist	6
	Pulse Snaping criterion?	
20	Write a short note on Eye pattern as evaluation tool for digital communication	6
	systems.	
21	Represent 100111010 using following digital data format	4
	Represent room room using ronowing digital data romat.	•
	(1) Polar RZ	
	(2) Bipolar NRZ	
22	Represent 10000000111000010 using following digital data format.	4
	(1) AMI (2) HDB3	
23	A television signal with a bandwidth of 4.2 MHZ is transmitted using PCM. The	5
	number of quantization level is 512. Calculate,	
	a)Code word length	

	b)Transmission bandwidth c)Final bit rate	
24	The bandwidth of TV video plus audio signal is 4.5 MHZ. If the signal is converted to PCM bit stream with 1024 quantization levels, determine the number of bits/sec generated by the PCM system. Assume that the signal is sampled at the rate of 20% above Nyquist rate.	5
25	<ul> <li>The bandwidth of signal input to the PCM is restricted to 4 kHz. The input varies from -3.8 V to +3.8 V and has the average power of 30 mW. The required signal to noise ratio is 20 dB. The modulator produces binary output. Assume uniform quantization.</li> <li>a) Calculate the number of bits required per sample.</li> <li>b) Outputs of 30 such PCM coders are time multiplexed. What is the minimum required transmission bandwidth for the multiplexed signal?</li> </ul>	5
26	The output signal to noise ratio of a 10 bit PCM was found to be 30 dB The desired SNR is 42 dB It was decided to increase the SNR to the desired value by increasing the number of quantization levels. Find the fractional increase in transmission bandwidth required for this increase in SNR.	5
27	A telephone signal bandlimited to 4 KHz is to be transmitted by PCM. The signal to quantization noise is to be at least 40 dB. Find the no of levels into which signal has to be encode. Also find the transmission bandwidth.	5