

CONTINUOUS INTERNAL EVALUATION- 3

Dept: EC Sem / Div: V Course: Principles of Communication Systems Course Code: 18EC53

Date: 13/01/2021 Time: 9:30-11:00 Max Marks: 50 Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

Q N	Questions	Marks	RBT	COs
PART A				
1	a With neat Block diagrams explain the generation and detection of PPM waves.	7	L2	CO4
	b Derive the expression for the output Signal to Noise Ratio of a Quantizer	8	L2	CO4
	c What are the desirable properties of digital waveforms? To transmit a bit sequence 10011011, draw the resulting waveforms using:- Unipolar NRZ; polar NRZ; Unipolar RZ ; Bipolar RZ ; Manchester(split phase)	10	L3	CO4
OR				
2	a What is the necessity of Digitizing of the analog signals?	8	L2	CO4
	b With a neat diagram explain the basic elements of a PCM system.	10	L2	CO4
	c A TV signal with a bandwidth of 4.2 MHz is transmitted using binary PCM. The number of representation level is 512. Calculate: i) Code word length ii) Final bit rate iii) Transmission bandwidth	7	L3	CO4
PART B				
3	a Describe the effect of noise on a PPM system.	7	L1	CO4
	b A compact disc (CD) records audio signals digitally using PCM. Assume the audio signal bandwidth to be 15 KHz.	8	L3	CO4
	i. What is the Nyquist rate?			
	ii. If the Nyquist samples are quantized to $L = 65, 536$ levels and then binary coded, determine the number of bits required to encode a sample.			
	iii. Assuming that the signal is sinusoidal and that the maximum signal amplitude is 1 volt; determine the quantization step and the signal-to-quantization noise ratio.			
	c What is quantization process? Explain the different types of quantization with their input output characteristics.	10	L2	CO4
OR				
4	a Explain channel vocoder with neat diagram.	8	L2	CO4
	b For a sinusoidal modulating signal, show that the signal to quantization noise ratio is $(1.8+6R)$ dB, where R is the number of bits per sample.	7	L2	CO4
	c The bandwidth of signal input to the PCM is restricted to 4KHz. The input varies from $-3.8V$ to $+3.8V$ and has the average power of 30mW. The required signal to noise ratio is 20dB. The modulator produces binary output. Assume uniform quantization.	10	L3	CO4
	i. Calculate the number of bits per sample.			
	ii. Outputs of such PCM coders are time multiplexed. What is the minimum required transmission bandwidth for the multiplexed signal.			