School of Electronics Engineering
Winter Sem 2023-2024
Continuous assessment test - I
BECE306L – Digital Communication Systems

B.Tech (ECE) SLOT: A1 **Marks: 50**

Answer All Questions

Q. No		Marks
1.	a) State and prove sampling theorem in time domain.	04
	b) Determine the Nyquist sampling rate and the Nyquist sampling interval for the following signals: i. $x(t) = \sin(100\pi t)\cos(200\pi t)$ ii. $x(t) = \text{sinc}^2(100\pi t)$	06
2.	a) Find the DPCM transmitter and receiver output of the following signal $x(k) = \{0.3, 1.5, 0.7, 1, 2.3, 3.7, 2.8, 3.4, 2.8, 0\}$ by considering mid-rise type quantizer with step size of 1V.	06
	b) Derive the signal-to-quantization noise ratio for PCM system. Assume that input signal is sinusoidal signal.	04
3.	a) A TV signal x (t) of bandwidth 42 MHz is transmitted using binary PCM. The number of quantization level is 1024. Calculate: (i) Code word length (ii) Transmission Bandwidth (iii) Average output SNR (iv) Bit Rate.	05
	b) With the help of neat diagrams, explain the transmitter and receiver of pulse code modulation.	05
4.	a) Compare between PCM, Delta Modulation, Adaptive Delta Modulation, and Differential Pulse Code Modulation.	05
	b) Consider an analog input signal $x(t) = 0.1\sin(2\pi \times 10^4 t)$. For a Delta Modulation system, the signal is sampled at a rate of 8×10^4 Hz. Find out whether the slope overload distortion occurs for the following step size: (i) $\Delta = 4$ mV (ii) $\Delta = 160$ mV.	05