

EL-302 COMMUNICATION SYSTEMS -I

Time: 1hr 30 min

Max. Marks: 20

Note: Attempt all Questions. Assume any data if missing and clearly mention the assumption.

- Q1. a) State advantages of Amplitude modulation over Frequency [2] modulation.
- b) The pulse $p(t)$ is as shown in Figure 1. The Hilbert transform [2] of $p(t)$ is denoted by $q(t)$. The Hilbert transform of $q(t)$ is denoted by $r(t)$. Sketch the signal $r(t)$.

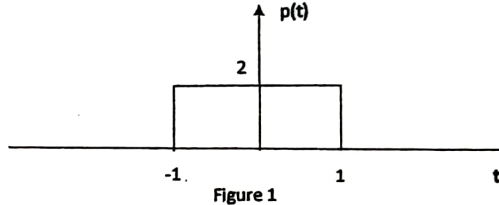


Figure 1

- c) State whether $x(t) = \frac{\sin(\pi t)}{\pi t}$ is an energy signal or power [2] signal. Compute the energy/power of $x(t)$.
- d) Sketch the spectrum of $y(t) = 10 \cos(100\pi t) + 20 \cos(200\pi t)$ [2]

P.T.O.

- Q2. For a DSB-SC system with channel noise power spectral density (PSD) $S_N(f) = 10^{-10}$ and a baseband signal of bandwidth 4kHz, the receiver output SNR is required to be at-least 30dB. The receiver is a synchronous demodulator. The carrier frequency is 1.6 MHz. What must be the signal power received at the receiver input? [4]
- Q3. Derive an expression for the time domain representation of an SSB-AM signal. [4]
- Q4. An AM signal with carrier is demodulated using a synchronous demodulator. However, the locally generated carrier has a phase error θ . Determine the effect of this error on demodulation. [4]

XXXXXXXXXXXX