

9/Sept/2025

# Assignment! CN

## ASSIGNMENT - 1

Date	_____
Page	_____

### Q.1:- Numericals:-

#### (i) Based on Frequency:-

- (a) An Em wave has wavelength  $\lambda = 150\text{m}$  and propagates  $v = 3 \times 10^8 \text{ m/s}$  find its frequency.
- (b) A digital clock signal operates at  $f = 26\text{Hz}$ . find its time period  $T$ .
- (c) The bit duration in digital link is  $250\text{ns}$ . find the clock frequency of transmitter.

#### (ii) Based on Amplitude:-

- (a) The voltage of a sinewave is given by:  
 $v(t) = A \sin(2\pi \cdot 50t + 90^\circ)$  At  $t=0$ , the measured voltage is  $5\text{V}$ . find the amplitude  $A$ .
- (b) A sinewave has period  $T = 4\text{ms}$  and is given by:  
 $v(t) = A \sin(2\pi ft + 0^\circ)$   
At  $t = 1\text{ms}$ , the voltage is  $3\text{V}$ . Find  $A$ .
- (c) The sinewave  $v(t) = A \sin(2\pi \cdot 60t + 30^\circ)$ , At  $t=0$ , the voltage is  $4\text{V}$ . Find  $A$ .

#### (iii) Based on phase:-

- (a) A sinewave is of offset  $\frac{1}{6}$  cycle wot zero. what is its phase in degree and radian.
- (b) A component has impedance  $Z = R + jX$  with  $R = 30\Omega$  and  $X = 40\Omega$ . find the phase angle of  $Z$ .
- (c) A phase is  $-144^\circ$ . what fraction of a cycle is this?

#### (iv) Based on Period:-

- (a) A sinewave has a frequency of  $f = 50\text{Hz}$ . find its Period  $T$  in seconds.
- (b) A sinewave has angular frequency  $\omega = 628\text{rad/s}$ . find its period  $T$ .



- (c) An AC signal has frequency  $f = 2\text{ kHz}$ . find  $T$ .
- (v) Based on Wavelength
- a) A sound wave travels at a speed of  $v = 340\text{ m/s}$  and has a frequency  $f = 170\text{ Hz}$ . find its wavelength.
- b) A radio wave travels at the speed of light ( $3 \times 10^8\text{ m/s}$ ) and has a frequency of  $100\text{ MHz}$ . find  $\lambda$ .
- (c) A light wave in vacuum has frequency  $6 \times 10^{14}\text{ Hz}$ . find its wavelength.

Q2. Define Nyquist formula and define Shannon formula.

Q. Explain data link protocols i.e HDLC and PPP.