

Department of Electrical Engineering
Mid Assignment Summer 2020
Subject: Communication Systems

Max Marks: 30

Question No. 1 (10)

- a. How SNR is related to quality of received signal in a wireless communication system?
- b. Draw and explain the basic block diagram of a communication system
- c. Why is it required to modulate the signal for distant wireless communication?
- d. Digital signals are not preferred for the communication over wireless communication channel despite the fact they are easy to represent and analyze. please support the statement with your argument.
- e. Determine the power and rms value of $f(t) = C \cos(\omega_0 t + \theta)$

Question No. 2 (10)

- a. Two sinusoidal signals $5 \cos 2\pi 10^6 t$ and $3 \cos 2\pi 10^3 t$ are desired to be transmitted over the distance of 20 kilometers. Determine the height of antennas for each signal required to receive the transmitted signals efficiently.
- b. Derive the expression for effective power accumulated in the spectrum of an AM wave

Question No. 3 (10)

- a. Draw and explain the AM waveform for less than 100%, 100% and greater than 100% modulation cases considering carrier signal $e_c(t) = 12 \sin \omega t$ and a sinusoidal message signal.
- b. A sinusoidal carrier has amplitude of 7 V and frequency of 1 MHz It is amplitude modulated by the sinusoidal voltage of 3.5V and frequency 5 kHz.
 - i. Write the equation for message, carrier and modulated waves
 - ii. Plot the AM wave in time domain as well as its frequency domain spectrum
 - iii. Find the depth of modulation and calculate the transmission efficiency
 - iv. Calculate the total power in spectrum
 - v. Calculate the percentage power in USB