**UNIT-I**

**Electronic communication:**

1. What do you mean by communication? Draw the block diagram of communication system.
2. What are the different modes of modulation? Why there is a need of modulation?
3. What is the range of Ultra High Frequency (UHF)? Give its applications.
4. What are the three basic elements of every communication system? Explain each one of them in brief.
5. Given a three-stage system comprised of two amplifiers and one filter with an input power of $P\_{in}=0.01 mW$ and absolute power gains of $A\_{P\_{1}}=200$, $A\_{P\_{2}}=0.1$, and $A\_{P\_{3}}=1000$, determine
6. The input power in dBm
7. Output power $(P\_{out})$ in watts and dBm
8. The dB gain of each of the three stages
9. The overall gain in dB
10. A two-stage electronic amplifying system is built with its first stage of 23dBm power amplification. The second stage provides a power amplification of 4.
11. Determine the output power of stage 1 and stage 2 for an input power of 1mW.
12. Express the calculated powers in (a) in dBm.
13. Calculate the overall gain in dB.
14. A noise source operating at a bandwidth of 10kHz with an internal resistance of $100Ω$. Find the temperature of the noise source in $℃$ to generate a maximum RMS noise voltage of 125nV across the load resistance.
15. Calculate the thermal noise power in Watts and dBm for the following bandwidths and temperature:

 (a) $B=100 Hz, T=17℃$,

 (b) $B=100 kHz, T=100℃$

 (c) $B=1 MHz, T=500℃$

1. Determine the second, third and total harmonic distortion for a repetitive wave with a fundamental frequency amplitude of 10Vrms, a second harmonic amplitude of 0.2Vrms, and a third harmonic amplitude of 0.1Vrms.
2. Determine the overall noise factor and noise figure for three cascaded amplifiers with the following parameters:

$$A\_{1}=10 dB$$

$$A\_{2}=10 dB$$

$$A\_{3}=20 dB$$

$$NF\_{1}=3 dB$$

$$NF\_{2}=6 dB$$

$$NF\_{3}=10 dB$$

1. For an amplifier operating at a temperature of$ 27℃$ with a bandwidth of 20kHz, determine

(a) The total noise power in watts and dBm.

(b) The rms noise voltage (VN) for a 50$Ω$ internal resistance and a 50- load resistor.

1. Determine the noise power in watts and dBm for an amplifier operating at a temperature of $400℃$ with a 1-MHz bandwidth.

(b) Determine the decrease in noise power in decibels if the temperature decreased to 100$℃$.

(c) Determine the increase in power in decibels if the bandwidth is doubled.

1. Determine the noise figure for an amplifier with an input signal-to-noise ratio of 30dB and an output signal-to-noise ratio of 24dB.
2. Calculate the output signal-to-noise ratio for an amplifier with an input signal-to-noise ratio of 23dB and a noise figure of 6.2dBA modulating signal 10 sin(2π x 103t) is used to modulate a carrier signal 20 sin(2π x 104t). Determine the modulation index, percentage modulation, frequencies of the sideband components and their amplitudes. What will be the bandwidth of the modulated signal?