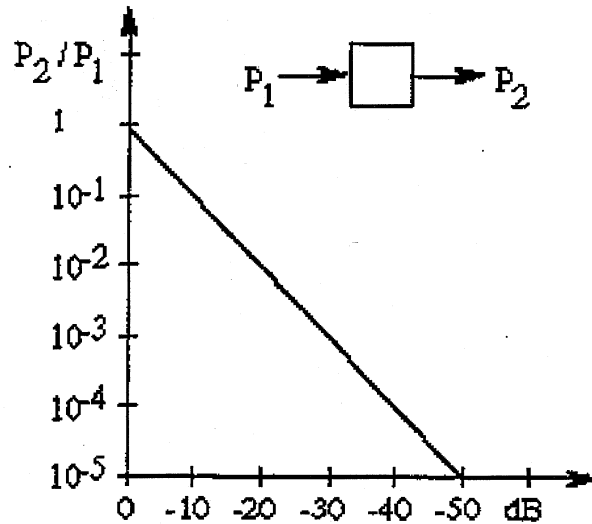


CHAPTER 1

FIBER OPTIC COMMUNICATIONS SYSTEMS

1-1 $\text{dB} = 10 \log_{10} (P_2/P_1)$

Loss (dB)	Fractional Power (P_2/P_1)
0	1
-1	0.8
-3	0.5
-6	0.25
-10	0.1
-20	0.01
-30	0.001
-40	0.0001
-50	0.00001



1-2 $\text{dB} = 10 \log_{10} (P_2/P_1)$

$$\text{dB}/10 = \log_{10} (P_2/P_1)$$

$$P_2/P_1 = 10^{\text{dB}/10}$$

$$P_2 = P_1 \times 10^{\text{dB}/10} = 0.001 \times 10^{\text{dB}/10}$$

1-3 $P_1 = 2 \text{ mW}$

$$P_2 = P_1 10^{\text{dB}/10} = 2 \times 10^{-3} \times 10^{-11/10} = 0.159 \text{ mW}$$

1-4 $P_2 = P_1 10^{\text{dB}/10} = 10 \times 10^{-9}$

$$P_1 = P_2 10^{-\text{dB}/10} = 10 \times 10^{-9} \times 10^{-(50)/10}$$

$$P_1 = 10 \times 10^{-9} \times 10^5 = 10^6 \times 10^{-9} = 10^{-3} \text{ W} = 1 \text{ mW}$$