1. The BER equation for BPSK systems in static environments (AWGN) is expressed as

$$P_e = Q(\sqrt{\frac{2E_b}{N_0}})$$

Find the BER equation for BPSK systems in rayleigh fading environments. The amplitude

of a faded signal is described as $P(\alpha) = \frac{\alpha}{\sigma^2} \exp(\frac{-\alpha^2}{2\sigma^2})$.

2. (a) Calculate the required value of $\frac{E_b}{N_0}$ (in dB) to achieve the BER value of 0.01 for BPSK systems in static (AWGN) environments.

(b) Calculate the required value of $\frac{E_b}{N_0}$ (in dB) to achieve the BER value of 0.01 for BPSK systems in rayleigh fading environments.