Q. 3 (a) Consider a random process $X(t)$ given by

$$X(t) = A\cos(\omega t + \theta)$$

where ω and θ are constants and A is a random variable.
Determine whether $X(t)$ is WSS? **(3 marks)**

(b) A binary signal $S_i(t)$ is a +1 Volt or -1 Volt pulse during the interval (0, T). AWGN with PSD $N_0/2 = 10^{-15}$ Watts/Hz is added to the signal. Determine the minimum bit rate that can be sent with a bit error probability of $P_b \leq 10^{-4}$. **(5 marks)**