Problem 1 (10 Points) Given an LTI system with an impulse response $h(t)$ derive the formula for the mean $\mu_Y(t)$ and the autocorrelation function $R_Y(t,s)$ for the output stochastic process when the input is a stochastic process $X(t,\omega)$ with mean $\mu_X(t)$ and autocorrelation function $R_X(t,s)$.

Problem 2 (10 Points) Given an LTI system with an impulse response $h(t)$ derive the formula for the power spectral density $S_Y(\omega)$ when the input power spectral density is $S_X(\omega)$.