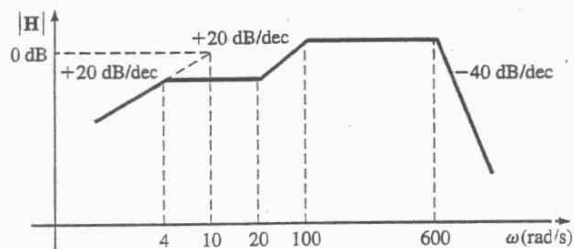## EXAM 3

1. Short answer questions

a. Explain the difference between power dissipated, apparent power, and reactive power. Sketch an example showing the relationship between these quantities.

b. Find the transfer function that would result in the Bode plot shown below.

c. (i) Briefly explain what the frequency response of a circuit is and why we might be interested in knowing it.

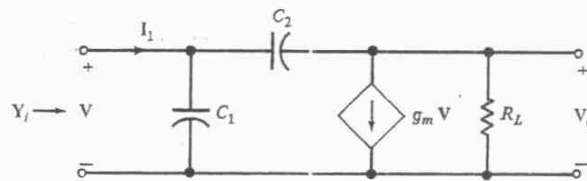(ii) Briefly explain what resonance means.

2. Sketch the Bode plot (include both magnitude and phase plots) for the following transfer function.

$$H(j\omega) = \frac{-j2.5(200+j\omega)(2+j80\omega)^2}{\omega^3}$$

3. The circuit below is a model of a device known as a transistor. Find expressions for the two transfer functions $H = \dfrac{V_o}{V}$ (voltage gain) and $Z_1 = \dfrac{V}{I_1}$ (input impedance) as a function of frequency ω.

EXAM 3

4. In the circuit below, switch S opens at $t = 0$. Find $v_c(t)$ if $v_c(0) = 0$ (C is initially uncharged). The current source $i(t) = I_0$.