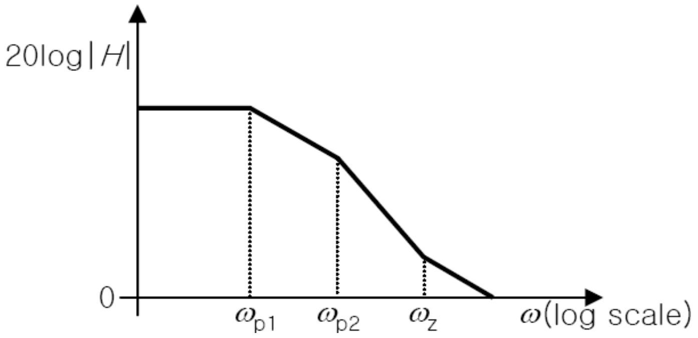
Quiz 7	Subject	Professor	Student ID#	Student Name	Score
Date: 2009.10.28	Microelectronics 2	Jong-Ho Lee			

1. Following figure depicts the magnitude response of an amplifier. Assume that $100\omega_{p1} < \omega_{p2}$ and $100\omega_{p2} < \omega_z$. Answer for the following questions.

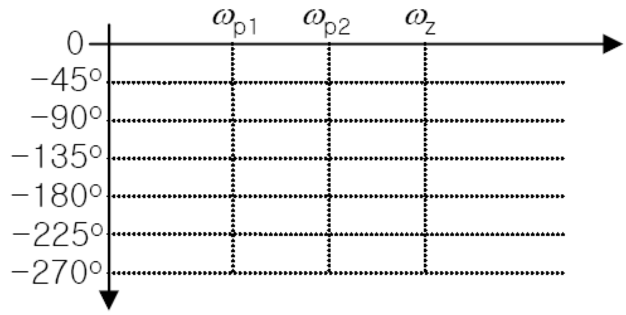


(a) Write down the transfer function H(s) for the system having above frequency response. Assume the gain at low frequency is A_0. (2)

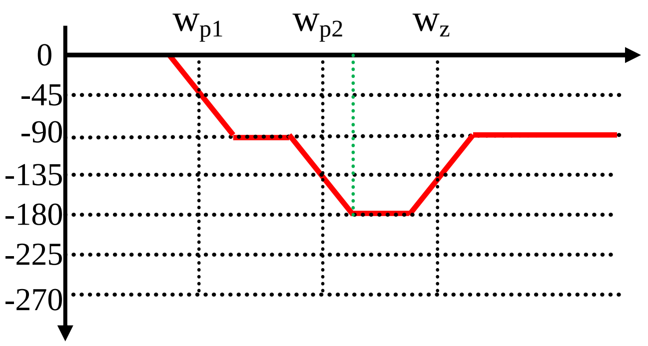
Answer)

$$H(s) = \frac{A_o(1+\frac{s}{w_z})}{(1+\frac{s}{w_{p1}})(1+\frac{s}{w_{p2}})}$$

(b) Using Bode's rule, plot schematically the phase response in the following figure. (4)



Answer)



(c) Determine whether the system oscillate or not. Then explain the reason briefly.

Answer)

This system doesn't oscillates, since the phase shift doesn't reaches -180˚.

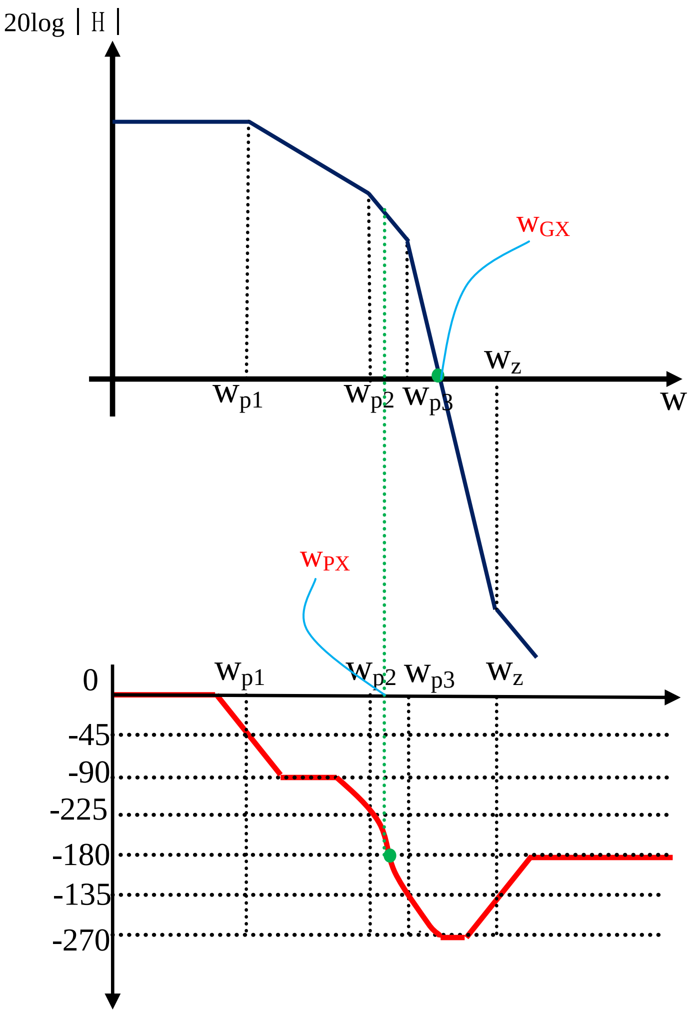
☼ A phase shift reaches -180˚ only at w=∞ in a two-pole system. (Two-pole system cannot oscillate.)

(d) Assume that there is a third pole (ω_{p3}) between ω_{p2} and ω_z. Also assume ω_{p3}=10ω_{p2}. Now determine if the system is unstable or not, and explain the reason briefly. (2)

Answer)

This system is unstable because at $\angle H = -180, |H| > 1$.

After w_{P3} is added, the phase response also shows $w_{PX} < w_{GX}$.



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