Quiz: Frequency Response (1)

(1) A Pole Causes a total Phase shift equal to ..

-90 degrees

(2) For $H(s) = \frac{10s(1+s)(1-\frac{s}{10^9})}{(1+\frac{s}{10^2})^2(1+\frac{s}{10^6})(1+\frac{s}{10^9})}$. the Phase shift is equal to ..

∵ No. of zeros = 3 → 2 in LHP → $-180°$
→ 1 in RHP → $+90°$

∵ No. of Poles = 4 (All in LHP) → $-360°$

∴ @ Very high freq. Phase shift = $-270°$

(3) For $H(s) = \frac{10s}{(1+\frac{s}{10^2})(1+\frac{s}{10^7})}$, the Phase @ $\omega = 2\times10^4$ rad/s is approx. equal ...

∵ $H(j\omega) = \frac{10 \times 2\times10^4 j}{(2\times10^2 j)(1)} = 10^3$

∴ Phase = $0°$

(4) for a CS amplifier with degeneration resistance shunted by a bypass cap, the bypass cap acts as ..

HPF

(5) A RHP zero Causes a total Phase shift that is equal to ...

-90 degree

(6) for a CS amplifier, the feed forward zero is caused by C_{gd}. lies in

$\therefore S_G = -\frac{G_m}{C_F}$ and G_m for CS is $-Ve$

$\therefore S_C$ is $+Ve \rightarrow \therefore$ in RHP

(7) For $H(s) = \frac{10s}{(1+\frac{s}{10^2})(1+\frac{s}{10^7})}$, the midband gain is equal to... dB

a) $\omega \gg 10^2$ and $\omega \ll 10^7$

$\therefore H(j\omega) = \frac{10(j\omega)}{(\frac{j\omega}{10^2})(1)} = 10^3 = 60$ dB

(8) The OCTC technique gives -- estimate for the dominant Pole in the high-freq range.

Pessimistics

(9) For $H(s) = \frac{s^2(1-\frac{s}{10^6})}{(1+s)^2(1+\frac{s}{10^3})(1+\frac{s}{10^9})}$ the magnitude at $\omega = 5\times10^7$ rs is approx equal - dB

$H(j\omega) = \frac{-(5\times10^7)^2(-5\times10)}{-(5\times10^7)^2(5\times10^{21}j)(1)} = \frac{1}{10^3 j}$

$\therefore |H(j\omega)| = -60$ dB

(10) for MOS biased in Pinch-off, the largest cap is... C_{gs}