2.6-2 (b, c)

$$H_p(s) = \frac{s^3}{s^3 + 2s^2 + 2s + 1}$$

$1\ dB = 20 \log_{10}(x)$

$x = (1\ dB)\, 10^{\left(\frac{1}{20}\right)} = 1.1220$

So, 1 dB point is the "ω" where $|H_p(s)| = \frac{1}{1.1220} = 0.8913$

$$H_p(s)\Big|_{s=j\omega_o} = \frac{-j\omega_o^3}{-j\omega_o^3 - 2\omega_o^2 + j2\omega_o + 1} = \frac{(\quad) + j(-\omega_o^3)}{(1-2\omega_o^2) + j(2\omega_o - \omega_o^3)}$$

Then, $(0.8913)^2 = \left(|H_p(s=j\omega)|\right)^2 = \dfrac{(\quad)^2 + (-\omega_o^3)^2}{(1-2\omega_o^2)^2 + (2\omega_o - \omega_o^3)^2}$

$$= \frac{\omega_o^6}{(4\omega_o^4 - 4\omega_o^2 + 1) + (\omega_o^6 - 4\omega_o^4 + 4\omega_o^2)} = \frac{\omega_o^6}{\omega_o^6 + 1}$$

$$(0.8913)^2(\omega_o^6 + 1) = \omega_o^6 \Rightarrow (0.8913)^2(\omega_o^6 + 1) - \omega_o^6 = 0$$