ch17. | 14, 15, 18, 19, 22, 26, 28, 33

14. $\beta_1 = 85dB$ $\beta_2 = 65dB$ $\Delta\beta = 20dB$

$\beta = (10dB)\log\frac{I}{I_0}$. $I = \frac{P}{A}$

$\therefore \Delta\beta = \beta_1 - \beta_2 = (10dB)\log\frac{P_1}{P_2}$. $\therefore \frac{P_1}{P_2} = \sqrt{10} = 3.16$.

$\Delta\beta(r = (23m)) = 5dB$

15. (a) $v_s = 331 m/s$ $v = 1.5 v_s$

$\sin\theta = \frac{v_s}{v}$. $\theta = \arcsin\frac{1}{1.5}$ $\theta = 0.73rad$.

(b) $t = \frac{L}{v}$ $v = \frac{d}{\tan\theta}$ 代入：$t = 10.43s$

18. (a) $f' = f \cdot \frac{v - v_D}{v}$. f_{12} 均由一也硬一也软异.

故. $f = \frac{5v}{4L}$. (a) $\frac{5v}{4L} \cdot \frac{v - v_D}{v} = \frac{v}{4L}$. $\therefore 4v = 5v_D$ $\therefore v_D = \frac{4}{5}v$.

(b) $\frac{5v}{2L} \cdot \frac{v - v_D}{v} = \frac{v}{2L}$. $\therefore v_D = \frac{4}{5}v$. (c) $v_D = \frac{4}{5}v$. (d) $v_D = \frac{4}{5}v$.

19. (a) $I = \frac{P}{A}$. $A = 4\pi r^2$. 代入 $\therefore I = 7.37 \times 10^{-5} W \cdot m^{-2}$

(b) $P_m = I \cdot A_m = 5.75 \times 10^{-9} W$.

22. (a) Closed at one end. $f = \frac{nv}{4L}$ $(n = 1, 3, 5 \ldots)$.

second lowest $n = 3$. $f = \frac{3 \times 340}{4 \times 0.9} = 283.3 Hz$.

$v = \sqrt{\frac{T}{\mu}}$. $\mu = \frac{m}{L}$ $\therefore v = \sqrt{\frac{T \cdot L}{m}}$. $\therefore T = 1070.4N$.

26. (a) $S_m = \frac{\rho P_{max}}{v\rho\omega}$

(b). $\omega = \frac{2\pi}{T}$ 代入：$S_m = 7.7\times10^{-9}m$.

(b). $k = \frac{\omega}{v} = 9.15\ rad\cdot m^{-1}$.

(c). $\omega = 3.14\ rad\cdot s^{-1}$.

(d) $S_m' = 7.4\times10^{-9}m$ (e). $k = 9.81\ rad\cdot m^{-1}$

(f). $\omega = 3.114\times10^{3}\ rad\cdot s^{-1}$.

28 (a). $d = \frac{\lambda}{2}$ $S_{net} = 0$.

(b). S_1 与 S_2. $S_{net} =$ ~~(c). $S_{net} = 4S_m$~~

(c). $S_{net} = 4S_m$.

33. $f_b = 4.5Hz$ $f_f = 440Hz$

$T = \frac{1}{f_b + f_f} = 2.4\times10^{-3}s$.