

# Chapter 9

①

100.7 dB

②

35.5  $\mu$ V

⑤

16  $\rightarrow$  [17.96, 20.16, 22.63 Hz]

⑥

$f_0 = 500 \text{ Hz} \rightarrow$

353.6  $\rightarrow$  707 Hz

$f_0 = 63 \text{ Hz} \rightarrow$

44.5  $\rightarrow$  89.1 Hz

⑦

T = 111 s

⑧

60 kHz

⑩

$f_s = 1000 \text{ Hz}$

## Chapter 9

① sensitivity  $-60 \text{ dBV}/\mu\text{bar}$

$V_{\text{out}}$   $21.6 \text{ mV}$

Find sound pressure level

$$L_s = 20 \log \left( \frac{E_{\text{out}}}{p} \right) \text{ dBV}/\mu\text{bar}$$

$$10^{L_s/20} = \frac{E_{\text{out}}}{p}$$

$$p = E_{\text{out}} 10^{-L_s/20}$$

$$= 21.6 \text{ mV} 10^{+60/20}$$

$$= 21.6 \mu\text{bar}$$

$$= ~~21.6~~ 2.16 \text{ Pa}$$

$$L_p = 20 \log \left( \frac{p}{p_0} \right)$$

$$= 20 \log \left( \frac{2.16 \text{ Pa}}{20 \mu\text{Pa}} \right) = 100.7 \text{ dB}$$

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or

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$$E_{\text{out}} = 0.0002 \times 10^{(L_p + L_s)/20}$$

$$20 \log \left( \frac{E_{\text{out}}}{0.0002} \right) = L_p + L_s$$

$$L_p = 20 \log \left( \frac{E_{\text{out}}}{0.0002} \right) - L_s$$

$$= 20 \log \left( \frac{0.0216}{0.0002} \right) - (-60)$$

$$= 100.7 \text{ dB}$$