

## 18-2 The Speed of sound

18-02

Question 99

The volume of a certain solid shrinks by 2 parts in  $10^6$  when it is subject to an external hydrostatic pressure of 1 atm. The density of the solid is  $8.0 \text{ g/cm}^3$ . What is the speed of a longitudinal wave through this material?

- (a)  $3.4 \times 10^3 \text{ m/s}$ .
- (b)  $1.5 \times 10^3 \text{ m/s}$ .
- (c)  $2.5 \times 10^2 \text{ m/s}$ .
- (d)  $2.5 \times 10^3 \text{ m/s}$ .
- (e)  $3.4 \times 10^2 \text{ m/s}$ .

18-02

0.31-59%

Question 100

A sound wave travels from air to water, then

- (a) its speed decreases.
- (b) its frequency decreases.
- (c) its frequency increases.
- (d) its speed increases.
- (e) its wavelength will remain unchanged.

18-02

0.29-10%

Question 101

In a liquid having density  $1.30 \times 10^3 \text{ kg/m}^3$ , longitudinal waves with frequency of 400 Hz are found to have a wavelength of 8.0 m. Calculate the bulk modulus of the liquid.

- (a)  $6.64 \times 10^{12} \text{ Pa}$ .
- (b)  $1.33 \times 10^{10} \text{ Pa}$ .
- (c)  $9.62 \times 10^7 \text{ Pa}$ .
- (d)  $3.12 \times 10^6 \text{ Pa}$ .
- (e)  $1.20 \times 10^{11} \text{ Pa}$ .

## 18-3 Traveling Sound waves

18-03

0.25-25%

Question 102

If two sound waves, one in air and the other in water, are of equal intensity. What is the ratio of the pressure amplitude of the wave in water to that of the wave in air? ( $\rho(\text{air}) = 1.21 \text{ kg/m}^3$ ,  $v(\text{air}) = 343 \text{ m/s}$ ,  $\rho(\text{water}) = 1 \times 10^3 \text{ kg/m}^3$ ,  $v(\text{water}) = 1482 \text{ m/s}$ )

- (a) 78.2
- (b) 35.7
- (c) 99.2
- (d) 82.3
- (e) 59.8

18-03

0.38-23%

Question 103

The maximum pressure amplitude that the human ear can tolerate in loud sounds is 28 Pa. What is the displacement amplitude for such a sound in air of density  $1.21 \text{ kg/m}^3$  at a frequency of  $5.0 \times 10^3 \text{ Hz}$ ? [speed of sound in air = 343 m/s].

- (a)  $4.15 \times 10^{-6} \text{ m}$ .
- (b)  $50.5 \times 10^{-6} \text{ m}$ .
- (c)  $11.0 \times 10^{-6} \text{ m}$ .
- (d)  $2.15 \times 10^{-6} \text{ m}$ .
- (e)  $8.30 \times 10^{-6} \text{ m}$ .