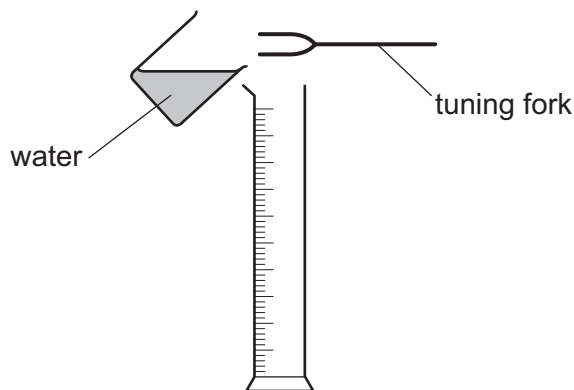


- 23** A police car travels at a velocity of  $30.0 \text{ m s}^{-1}$  directly towards a stationary observer. The horn of the car emits sound of frequency  $2000 \text{ Hz}$ . The speed of sound is  $340 \text{ m s}^{-1}$ .

What is the frequency of the sound heard by the observer?

- A** 1840 Hz      **B** 2000 Hz      **C** 2180 Hz      **D** 2190 Hz

- 24** A vibrating tuning fork is held over a measuring cylinder, as shown.



Water is then gradually poured into the measuring cylinder. A much louder sound is first heard when the water level is  $2.9 \text{ cm}$  above the base of the measuring cylinder. A second much louder sound is heard when the water level reaches a height of  $67.3 \text{ cm}$  above the base.

The speed of sound in air is  $330 \text{ m s}^{-1}$ .

What is the frequency of the tuning fork?

- A** 128 Hz      **B** 256 Hz      **C** 512 Hz      **D** 1024 Hz

- 25** A water wave in a ripple tank is diffracted as it passes through a gap in a barrier.

Which two factors affect the angle of diffraction of the wave?

- A** the amplitude and frequency of the incident wave  
**B** the amplitude of the incident wave and the width of the gap  
**C** the wavelength and amplitude of the incident wave  
**D** the wavelength of the incident wave and the width of the gap

- 26** A double-slit interference pattern using red light of wavelength  $7.0 \times 10^{-7} \text{ m}$  has a fringe spacing of  $3.5 \text{ mm}$ .

Which fringe spacing would be observed for the same arrangement of apparatus but using blue light of wavelength  $4.5 \times 10^{-7} \text{ m}$ ?

- A** 2.3 mm      **B** 3.5 mm      **C** 5.4 mm      **D** 9.0 mm