

car velocity is 120 ms^{-1} . Find the frequency heard by the boy? (when the car moving forward).

Answer : Given

Frequency of car's horn, $n = 800 \text{ Hz}$

Velocity of source, $V_s = 120 \text{ ms}^{-1}$

Velocity of sound, $v = 340 \text{ ms}^{-1}$

To find: Frequency emitted by the car, $n' = ?$

Solution

$$\text{Apparent frequency, } n' = \left(\frac{v}{v - v_s} \right) \times n$$

$$= \frac{340}{340 - 120} \times 800$$

$$= \frac{340}{220} \times 800$$

$$\text{Apparent frequency, } n' = 1236 \text{ Hz}$$

35) At 10° C , how far away is a reflecting surface if you hear an echo in 0.274 s ?

Answer : Given

Temperature, $T = 10^\circ \text{ C}$

Time, $t = 0.274 \text{ s}$

Distance, $D = ?$

Velocity, $v = (v_0 + 0.61T) \text{ ms}^{-1}$

$$v = [331.4 + 0.61 \times 10]$$

$$331.4 + 6.1$$

$$v = 337.5 \text{ ms}^{-1}$$

Distance, $D = v \times t$

$$D = 337.5 \times 0.274$$

$$D = 92.48 \text{ m}$$

$$\text{Distance due to reflecting surface} = \frac{\text{distance}}{2}$$

$$= 46.2 \text{ m}$$