

A sound source is emitting a frequency of 750-Hz. Determine the frequency heard by:

- a) A person who is approaching the sound source at a speed of 15 m/s
- b) A person who is receding from the sound source at a speed of 15 m/s

Given:

Frequency of sound source:

$$f_s = 750 \text{ Hz}$$

Speed of the person:

$$v_p = 15 \text{ m/s}$$

Determine:

- a) Frequency heard by person who is approaching the sound source: f_p

Use formula:

$$f_p = f_s \times [1 + (v_p / v)] \quad \dots \dots \dots \quad (1)$$

“v” is the speed of sound waves and has a value of 343 m/s in air at 20° C.

Substituting for f_s , v_p and v in (1):

$$f_p = 750 \times [1 + (15 / 343)] = 783 \text{ Hz}$$

- b) Frequency heard by person from whom the sound source is receding: f_p

Use formula:

$$f_p = f_s \times [1 - (v_p / v)] \quad \dots \dots \dots \quad (2)$$

“v” is the speed of sound waves and has a value of 343 m/s in air at 20° C.

Substituting for f_s , v_p and v in (2):

$$f_p = 750 \times [1 - (15 / 343)] = 717 \text{ Hz}$$