National 5 Physics
Waves
Equation Practice

Contents

1 Frequency, Number of Waves & Time

Use the following equation to answer the questions below, then check your answers using the numerical answers at the end of this document.

$$\boxed{f = \frac{N}{t}}$$

where

- f is frequency measured in hertz (Hz)
- N is number of waves (no units)
- t is time measured in seconds (s).

1.1 Calculating Frequency (f)

1. A wave generator produces 300 waves in 60 s. What is the frequency of the waves?

2. In an experiment, 240 waves are counted in 80 s. What is the frequency?

3. A sound wave has 700 waves passing a point in 100 s. Calculate the frequency of this sound wave.

4. A radio wave has 5×10^4 waves passing a point in 25 s. What is the frequency?

5. In a certain type of signal, 1×10^6 waves pass a point in 80 s. What is the frequency?

1.2 Calculating Number of Waves (N)

1. A wave has a frequency of 5 Hz and is observed for 10 s. How many waves are produced?

2. If a wave with a frequency of 8 Hz is observed for 12.5 s, how many waves are produced?

3. A sound wave has a frequency of 15 Hz and is monitored for 20 s. Calculate the total number of waves.

4. A wave with a frequency of 200 Hz is observed for 3 minutes. How many waves are produced?

5. If a wave with a frequency of 30 Hz is monitored for 2 hours, how many waves are generated?

1.3 Calculating Time (t)

1. A wave has a frequency of 10 Hz and 200 waves are produced. How long does it take?

2. If a sound wave has a frequency of 25 Hz and 1000 waves are counted, what is the time taken?

3. A wave has a frequency of 70 Hz and 210 waves are observed. Calculate the time.

4. A radio wave has a frequency of 2 kHz and 1.2×10^5 waves are counted. What is the time taken?

5. If a signal wave has a frequency of 1 MHz and 2×10^6 waves are produced, what is the time taken?

2 Period & Frequency

Use the following equation to answer the questions below, then check your answers using the numerical answers at the end of this document.

$$\boxed{T = \frac{1}{f}}$$

where

- T is period measured in seconds (s)
- f is frequency measured in hertz (Hz).

2.1 Calculating Period (T)

1. A sound wave has a frequency of 440 Hz (A4 note on a piano). Calculate the period of this sound wave.

2. An ultrasound wave has a frequency of 2.5×10^6 Hz. Calculate the period of this ultrasound wave.

3. A light wave has a frequency of 5×10^{14} Hz. Determine its period.

4. The frequency of an electromagnetic wave emitted by a microwave oven is 2.45 GHz. What is the period of this wave?

5. A radio wave used in AM broadcasting has a frequency of 950 kHz. What is the period of this radio wave?

2.2 Calculating Frequency (f)

1. A pendulum completes one full swing every 2 s. Calculate the frequency of this pendulum.

2. An electrical circuit has a periodic signal with a period of 0.04 s. What is the frequency of this signal?

3. Ocean waves pass a pier, where each wave crest arrives every 5 s. Find the frequency of the ocean waves.

4. A medical imaging device generates waves with a period of 0.8 ms. Determine the frequency of these waves.

5. A radio transmitter emits waves with a period of 0.25 ms. Calculate the frequency.

5 Numerical Answers

1 Frequency, Number of Waves & Time

1.1 Calculating Frequency (f)

1. 5 Hz
2. 3 Hz
3. 7 Hz
4. 2×10^3 Hz
5. 1.25×10^4 Hz

1.2 Calculating Number of Waves (N)

1. 50
2. 100
3. 300
4. 3.6×10^4
5. 2.16×10^5

1.3 Calculating Time (t)

1. 20 s
2. 40 s
3. 3 s
4. 60 s
5. 2 s

2 Period & Frequency

2.1 Calculating Period (T)

1. 2.3×10^{-3} s
2. 4.0×10^{-7} s
3. 2×10^{-15} s
4. 4.08×10^{-10} s
5. 1.1×10^{-6} s

2.2 Calculating Frequency (f)

1. 0.5 Hz
2. 25 Hz
3. 0.2 Hz
4. 1.25×10^{3} Hz
5. 4.0×10^{3} Hz