Phys11 Period and Frequency : W.S.-10

Many phenomena in physics are cyclic. That is, they exhibit some repeatable motion. For example a pendulum moves back and forth continually as long as friction is minimal. The time for one back and forth motion, or one **cycle**, is called the **period**. The symbol for the period is **T** and the units are seconds (s).

The **frequency** of the above pendulum is the number of cycles per second. This is simply 1/T. The symbol for frequency is **f**. The units are cycles/sec or Hertz (Hz).

The basic equation here is : **f** = 1/**T** or **T** = 1/**f**

In the pendulum example above if T = 2.0 s, then f = 0.50 Hz

Problems :

1)a) A bird flaps its wings 12.0 times per second. f = _____, T= _____

b) If the bird flies for 30.0 minutes, how many times will its wings flap?

2)a) A wheel rotates at 1200 r.p.m.(revolutions per minute). f = _____, T = _____

b) If the radius of the wheel is 45 cm find the distance a point on the wheel travels in one minute. _____

3)a) At the beach, a man counts 105 waves hit the shore in 15.0 minutes. f = _____, T = _____

b) How many waves will hit the beach in one day? _____

4)a) Certain sound waves have a period of 0.00139 s. f = _____

b) Certain A.M. radio waves have a frequency of 910 kHz. T = _____

5) A microprocessor has a speed (f) of 400. Mhz. T = _____

6) For the second hand of a watch, T = _____, and f = _____ . (give 2 sig figs)

7)a) A guitar string has a period of 0.00075 s. f = _____

b) What is the frequency of the sound emitted by the string?

Answers : 1a) 12.0 Hz, 0.0833 s, b) 2.16×10^{4}, 2)a) 20. Hz, 0.050 s, b) 3.4×10^{5} cm, 3)a) 0.117 Hz, 8.57 s, b) 1.01×10^{4}, 4)a) 719 Hz, b) 1.1×10^{-6} s, 5) 2.50×10^{-9}s, 6) 60. s, 0.017 Hz, 7)a) 1.3×10^{3} Hz, 1.3×10^{3} Hz.