Antenna Wave Length[1]

For any wave traveling at a constant speed, such as a radio wave:

$$\lambda = \frac{v}{f} \quad ,$$

where λ is the wave length, v is the velocity or approximately 300,000,000 m/s, and f is the frequency. If the frequency is in megahertz this is:

$$\lambda = \frac{300}{f} \text{ meters.}$$

One could use a metric rule or convert 300,000,000 m/s to 3.28 feet per meter x 300,000,000 m/s = 984,000,000 ft/s. Again if the frequency is in megahertz this is:

$$\lambda = \frac{984}{f} \text{ feet.}$$

This equation is often expressed in terms of the classic ½ wave dipole by dividing 984 by 2 or:

$$\lambda = \frac{492}{f} \text{ feet,}$$

for ½ wave dipole.

Questions

G9B10 (D)
What is the approximate length for a 1/2 wave dipole antenna cut for 14.250 MHz?
A. 8 feet
B. 16 feet
C. 24 feet
D. 32 feet

That is $\lambda = 984/f = 984/14.250 = 69.0$ feet. ½ wave dipole would be ½ this length or $69.0/2 = 34.5$ feet. The closest given answer is 32 feet. Therefore D is the answer. Or you could use the ½ wave dipole equation and $\lambda = 492/f = 492/14.250 = 34.5$ feet and D is still the correct answer.

G9B11 (C)
What is the approximate length for a 1/2 wave dipole antenna cut for 3.550 MHz?
A. 42 feet
B. 84 feet
C. 131 feet
D. 263 feet

1 2015-2019 Element 3 Question Pool, revised 11 February 2015

That is $\lambda = 984/f = 984/3.550 = 277.2$ feet. ½ wave dipole would be ½ this length or $277.2/2 = 138.6$ feet. Or more directly you could use the ½ wave dipole equation and $\lambda = 492/f = 492/3.550 = 138.6$ feet. The closest given answer is 131 feet. Therefore C is the answer using either method.

G9B12 (A)
What is the approximate length for a 1/4 wave vertical antenna cut for 28.5 MHz?
A. 8 feet
B. 11 feet
C. 16 feet
D. 21 feet

That is $\lambda = 984/f = 984/28.5 = 34.53$ feet. 1/4 wave dipole would be 1/4 this length or $34.52/4 = 8.6$ feet. The closest given answer is 8 feet. Therefore A is the answer. Or you could use the ½ wave dipole equation and realize that ¼ wave dipole is ½ of a ½ wave dipole. Either way the calculation yields 8.6 feet.