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Answers to NCERT/CBSE PHYSICS Class 12(Class XII)textbook Exercise and Additional exercise

Chapter 15.

- 15.1** Which of the following frequencies will be suitable for beyond-the-horizon communication using sky waves?
- (a) 10 kHz
 - (b) 10 MHz
 - (c) 1 GHz
 - (d) 1000 GHz

15.1 For communication beyond-the-horizon the frequency required is 10 MHz.

10 kHz will require a very large antenna of size

$$\approx \frac{\lambda}{4} = \frac{c}{f(4)} = \frac{3 \times 10^8}{10 \times 10^3 \times 4} = 7.5 \times 10^3 \text{ m.}$$

It is not practical to build an antenna of this size.

Frequencies in the range of 1GHz will penetrate the ionosphere so they

cannot be used because frequencies above 30 MHz penetrate the ionosphere and escape.