

### ELECTROMAGNETIC WAVES

- Write the order of frequency range and one use of each of the following electromagnetic radiations:
  - Microwaves
  - Ultra-violet rays.
  - Gamma rays.
- Give reasons for the following:
  - Long distance radio broadcast use shortwave bands.
  - The small ozone layer on top of the stratosphere is crucial for human survival.
  - Satellites are used for long distance TV transmission.
- Name the radiations of electromagnetic spectrum which are used in
  - Warfare to look through fog.
  - Radar and geostationary satellites.
  - Studying the structure and properties of atoms and molecules.
- Explain surface wave and sky wave propagations of radiowaves? Why is short wave communication over long distance not possible by ground wave?
- Find the wavelength of electromagnetic waves of frequency  $6 \times 10^{12}$  Hz in free space. Give its two applications.
- Why sky wave transmission of electromagnetic waves cannot be used for T.V. transmission? Suggest two methods by which the range of T.V. transmission can be increased.
- Deduce an expression for the distance upto which the T.V. signals can directly be received from a T.V. tower of height 'h'.
- A plane electromagnetic wave travels, in vacuum, along the y-direction. Write the :
  - Ratio of the magnitudes
  - the directions of its electric and magnetic field vectors.
- Give any two characteristics of electromagnetic waves. Write the expression for the velocity of electromagnetic waves in terms of the permittivity and permeability of the medium.