CLASS : XII
PHYSICS ASSIGNMENT

Unit V - Electromagnetic Waves

1. Why did Maxwell introduce the concept of displacement current?
2. Discuss Maxwell's modification of Ampere's Law?
3. State Maxwell's equations.
4. Write four characteristics of displacement current.
5. Draw a schematic diagram of Hert'z experimental set up to produce electromagnetic waves. Give its principle.
6. Differentiate between surface wave and sky wave.
7. Draw a neat diagram of electromagnetic spectrum.
8. What does an em wave consist of ? On what factors does its velocity in vacuum depend?
9. The small ozone layer on the top of the atmosphere is crucial for human survival. Why?
10. Em waves of frequency 5×10^{14} Hz are passed through a liquid. The wavelength of the wave in liquid is measured to be 4.5×10^{-7} m. Calculate
    (i) the wavelength of em waves in vacuum,
    (ii) velocity of em waves in the liquid and
    (iii) refractive index of the liquid. Given, velocity of em waves in vacuum = 3×10^8 m/s.
    (Ans.) (i) 6×10^{-7}m
    (ii) 2.25×10^8 m/s
    (iii) 1.33
11. Which physical quantity is the same for X-ray of wavelength 10^{-10}m, red light of wavelength 6800 A^o and radiowaves of wavelength 500m?
12. In a plane em wave, the electric field oscillates sinusoid-ally at a frequency of 2×10^{10} Hz and amplitude 48 Vm^{-1}.
    (a) What is the wavelength of the wave?
    (b) What is the amplitude of the oscillating magnetic field?
    (c) Find the total average energy density of the e.m. field of the wave.

    (Ans. (a) 1.5×10^{-2} m
    (b) 1.6×10^{-7} T
    (c) 1.0×10^{-8} J/m^3)

13. Name different constituents of e m spectrum. Give their important uses also.
14. In a particular medium, em waves propagate at a speed of 2.0×10^2 m/s. The relative permeability of the medium is 1.0. What is relative permittivity of the medium?
    (Ans $\in_r = 2.25$)
15. Name the part of em spectrum to which waves of wavelength (i) $1A^o$ and (ii) 10^2 m belong.