

Topic :-Electromagnetic Waves

- The density of air at the top of mesosphere in comparison to that of near the earth's surface is
a) 10^{-3} times b) 10^{-5} times c) 10^3 times d) 10^5 times
- A point source of electromagnetic radiation has an average power output of 800 W. The maximum value of electric field at a distance 4.0 m from the source is
a) 64.7 Vm^{-1} b) 57.8 Vm^{-1} c) 56.72 Vm^{-1} d) 54.77 Vm^{-1}
- The atmosphere above the height of 80 km is called
a) Stratosphere b) Troposphere c) Mesosphere d) Ionosphere
- Height h of transmitter antenna when R is radius of earth to have range d is
a) $d^2/2R$ b) $\sqrt{2dR}$ c) $2d^2/R$ d) $2R^2/d$
- Maxwell in his famous equation of electromagnetism introduced the concept of
a) AC current b) DC current
c) Displacement current d) Impedance
- The waves which have revolutionized telecommunication in more recent time, are
a) Micro wave b) Radio waves c) Light waves d) TV waves
- The charge of a parallel plate capacitor is varying as $q = q_0 \sin 2\pi ft$. The plates are very large and close together (area = A , separation = d). Neglecting edge effects, the displacement current through the capacitor is
a) $\frac{d}{A\epsilon_0}$ b) $\frac{d}{\epsilon_0} \sin 2\pi ft$ c) $2\pi f q_0 \cos 2\pi ft$ d) $\frac{2\pi f q_0}{\epsilon_0} \cos 2\pi ft$
- If a source is transmitting electromagnetic wave of frequency 8.2×10^6 Hz, then wavelength of the electromagnetic waves transmitted from the source will be
a) 36.6 m b) 40.5 m c) 42.3 m d) 50.9 m
- An electric field of 1500 Vm^{-1} and a magnetic field of 0.40 Wbm^{-2} act on a moving electron. The minimum uniform speed along a straight line the electron could have is
a) $1.6 \times 10^{15} \text{ ms}^{-1}$ b) $6 \times 10^{16} \text{ ms}^{-1}$ c) $3.75 \times 10^3 \text{ ms}^{-1}$ d) $3.75 \times 10^2 \text{ ms}^{-1}$
- The energy of X-ray photon is 3.3×10^{-16} J. Its frequency is
a) 2×10^{19} Hz b) 5×10^{18} Hz c) 5×10^{17} Hz d) 5×10^{16} Hz
- If a source is transmitting Electromagnetic Waves of frequency 8.196×10^6 Hz, then the wavelength of the Electromagnetic Waves transmitted from the source will be
a) 5090 cm b) 4050 cm c) 4230 cm d) 3660 cm

12. The phase velocity (v_p) of travelling wave is
 a) $v_p = \frac{\omega}{k}$ b) $v_p = \frac{d\omega}{dk}$ c) $v_p = c$ d) $v_p = \frac{c}{v_g}$
13. If a free electron is placed in the path of a plane electromagnetic wave, it will start moving along
 a) Centre of earth b) Equator of earth c) Magnetic field d) Electric field
14. The energy of X-ray photon is 2200 eV. Its frequency would be
 a) 5.3×10^{16} Hz b) 5.3×10^{17} Hz c) 5×10^{17} Hz d) 5×10^{16} Hz
15. Which of the following relation is correct?
 a) $\sqrt{\epsilon_0 E_0} = \sqrt{\mu_0 B_0}$ b) $\sqrt{\mu_0 \epsilon_0} E_0 = B_0$ c) $E_0 = \sqrt{\mu_0 \epsilon_0} B_0$ d) $\sqrt{\mu_0} E_0 = \sqrt{\epsilon_0} B_0$
16. According to Maxwell's equation the velocity of light in any medium is expressed as
 a) $\frac{1}{\sqrt{\mu_0 \epsilon_0}}$ b) $\frac{1}{\sqrt{\mu \epsilon}}$ c) $\sqrt{\mu/\epsilon}$ d) $\sqrt{\frac{\mu_0}{\epsilon}}$
17. Electromagnetic Waves of frequencies higher than $9\sqrt{2}$ MHz are found to be reflected by the ionosphere on a particular day at a place. The maximum electron density in the ionosphere is
 a) $\sqrt{5} \times 10^{12} \text{ m}^{-3}$ b) $\sqrt{2} \times 10^{12} \text{ m}^{-3}$ c) $2 \times 10^{12} \text{ m}^{-3}$ d) $5 \times 10^{12} \text{ m}^{-3}$
18. An electromagnetic wave, going through vacuum is described by $E = E_0 \sin(kx - \omega t)$
 Which of the following is independent of wavelength?
 a) k b) ω c) k/ω d) $k\omega$
19. Which of the following is absorbed by the ozone layer?
 a) Only gamma rays b) Visible light c) Radio Waves d) Ultraviolet rays
20. If the earth did not have atmosphere, its surface temperature on a day time would be
 a) Higher b) Lower c) Same as now d) Not sure