DPP

DAILY PRACTICE PROBLEMS

Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 5**

Topic :-Electromagnetic Waves

1. Instantaneous displacement current of 1.0 A in the space between the parallel plate of 1 μF capacitor can be estabilished by changing potential difference of
   a) 10^{-6}Vs^{-1} b) 10^{6}Vs^{-1} c) $1\ \text{Vs}^{-1}$ d) $0.1\ \text{Vs}^{-1}$
2. In a phase electromagnetic wave, the electric filed oscillates sinusoidally at a frequency of 2.0×10^{10} Hz and amplitude 48 Vm^{-1}. The wavelength of the wave is
   a) 24×10^{-10} m b) 1.5×10^{-2} m c) 4.16×10^{8} m d) 3×10^{8} m
3. Velocity of Electromagnetic Waves in a medium depends upon
   a) Thermal properties of medium
   b) Mechanical and electrical properties of medium
   c) electrical and magnetic properties of the medium
   d) Mechanical and magnetic properties of the medium
4. The electric field for a plane electromagnetic wave travelling in the positive z-direction is represented by which one of the following?
   a) $\hat{\mathbf{k}}_1 E_0 e^{i}(kz - \omega t + \phi)$ b) $\hat{\mathbf{i}}_1 E_0 e^{i}(kx - \omega t + \phi)$
   c) $\hat{\mathbf{i}}_1 E_0 e^{i}(kz + \omega t + \phi)$ d) $\hat{\mathbf{k}}_1 E_0 e^{i}(kz + \omega t + \phi)$
5. The fact that radiosignals reach the earth from outside the atmosphere, was discovered accidently by
   a) K. G. Jansky b) Millikan c) Aryabhatta d) Prof. Kanu
6. The electric field of an electromagnetic wave travelling through vacuum is given by the equation$E = E_0 \sin(kx - \omega t)$. The quantity that is independent of wavelength is
   a) $\frac{k}{\omega}$ b) $k\omega$ c) ω d) k
7. X-rays are produced by jumping of
   a) Electrons from lower to higher energy orbit of atom
   b) Electrons from higher to lower energy orbit of atom
   c) Protons from lower to higher energy orbit of nucleus
   d) Proton from higher to lower energy orbit of nucleus
8. The magnetic field between the plates of radius 12 cm separated by distance of 4 mm of a parallel plate capacitor of capacitance 100 pF along the axis of plates having conduction current of 0.15 A is
   a) Zero b) 1.5 T c) 15 T d) 0.15 T
9. The magnetic field between the plate of a capacitor when $r < R$ is given by

a) $\frac{\mu_0 i_D r}{2\pi R^2}$ b) $\frac{\mu_0 i_D}{2\pi R}$ c) $\frac{\mu_0 i_D}{2\pi r}$ d) Zero

10. The ozone layer absorbs
    a) Infrared radiations b) Ultraviolet radiations
    c) X-rays d) γ-rays
11. Out of the following electromagnetic radiation, which has the shortest wavelength?
    a) Radiowaves b) Infrared c) Ultraviolet d) X-rays
12. A circular ring of radius r is placed in a homogenous magnetic field perpendicular to the plane of the ring. The field B chnages with time according to the equation $B = kt$, where k is a constant and t is the time. The electric field in the ring is
    a) $\frac{kr}{4}$ b) $\frac{kr}{3}$ c) $\frac{kr}{2}$ d) $\frac{k}{2r}$
13. A cube of edge a has its edges parallel to x, y and z-axis of rectangular coordinate system. A uniform electric field $\vec{E}$ is parallel to y-axis and a uniform magnetic field is $\vec{E}$ parallel to x-axis. The rate at which flows through each face of the cube is
    a) $\frac{a^2.EB}{2\mu_0}$ parallel to $x-y$ plane and zero in others
    b) $\frac{a^2EB}{\mu_0}$ parallel to $x-y$ plane and zero in others
    c) $\frac{a^2EB}{2\mu_0}$ from all faces
    d) $\frac{a^2EB}{2\mu_0}$ parallel; to $y-z$ faces and zero in others
14. A radar sends the waves towards a distant object and receives the signal reflected by object. These waves are
    a) Sound waves b) Light waves c) Radio waves d) Micro waves
15. A lasser beam is sent to the moon and reflected back to earth by ay mirror placed on the moon by an astronaut. If the moon is 384000 km from earth, how long does it take the light to make the round trip?
    a) 5 min b) 2.5 min c) 2.5 s d) 500 s
16. A particles of mass 1×10^{-26}kg and charge 1.6×10^{-19}C travelling with a velocity 1.28×10^6 ms^{-1} along the positive X-axis enters a region in which a uniform electric field $\mathbf{E}$

    and a uniform magnetic field of induction $\mathbf{B}$ are present. If $\boldsymbol{E} = -10.24 \times 10^3\,\hat{\mathbf{k}}$ NC^{-1} and $B = 8 \times 10^{-2}\hat{\mathbf{j}}$ Wbm^{-2}, the direction of motion of the particles is

    a) Along the positive X-axis b) Along the negative X-axis
    c) At 45^0 to the positive X-axis d) At 135^0 to the positive X-axis
17. A radiation of energy E falls normally on a perfectly reflecting surface. The momentum transferred to the surface is
    a) $\frac{E}{c}$ b) $\frac{2E}{c}$ c) Ec d) $\frac{E}{c^2}$
18. Which of the following rays is emitted by a human body?
    a) X-rays b) UV rays c) Visible rays d) IR rays
19. A TV tower has a height of 100 m. How much population is covered by the TV broadcast if the

average population density around the tower is 100 km^{-2} (radius of the earth = 6.37×10^6 m)

a) 4 lakh b) 4 billion c) 40,000 d) 40 lakh

20. Radio wave diffract around building although light waves do not. The reason is that radio waves

a) Travel with speed target than c b) Have much larger wavelength than light

c) Carry news d) Are not electromagnetic waves