DPP
DAILY PRACTICE PROBLEMS

Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 2**

Topic :-Electromagnetic Waves

1. The wavelength of infrared rays is of the order of
   a) 5×10^{-7}m b) 10^{-3}m c) Diverge more d) None of these
2. Molybdenum is used as a target element for the production of X-rays because it is
   a) Light and can easily defect electrons b) Light and can absorb electrons
   c) A heavy element with a high melting point d) An element having high thermal conductivity
3. A charged particle with charge q enters a region of constant, uniform and mutually orthogonal fields **E** and **B** with a velocity **v** perpendicular to both **E** and **B**, and comes out without any change in magnitude or direction of **v.** Then
   a) $\mathbf{v} = \mathbf{E} \times \mathbf{B}/\mathrm{B}^2$ b) $\mathbf{v} = \mathbf{B} \times \mathbf{E}/\mathrm{B}^2$ c) $\mathbf{v} = \mathbf{E} \times \mathbf{B}/\mathrm{E}^2$ d) $\mathbf{v} = \mathbf{B} \times \mathbf{E}/\mathrm{E}^2$
4. If v_s, v_x and v_m are the speeds of gamma rays, X-rays and microwaves respectively in vacuum, then
   a) $v_s > v_x > v_m$ b) $v_s < v_x < v_m$ c) $v_s < v_x < v_m$ d) $v_s = v_x = v_m$
5. The small ozone layer on top of the atmosphere is crucial for human survival because it
   a) Has ions b) Reflects radio signals c) Absorbs UV rays d) Reflects IR rays
6. Television signals reach us only through the ground waves. The range R related with the transmitter height h is in proportion to
   a) h b) $h^{1/2}$ c) $h^{-1/2}$ d) h^{-1}
7. In a plane electromagnetic wave propagating in space has an electric field of amplitude 9×10^3 Vm^{-1}, then the amplitude of the magnetic field is
   a) 2.7×10^{12} T b) 9.0×10^{-3} T c) 3.0×10^{-4} T d) 3.0×10^{-5} T
8. A capacitor having a capacity of 2 pF. Electric field across the capacitor is changing with a value of 10^{12} Vs^{-1}. The displacement current is
   a) 2 A b) 4 A c) 6 A d) 10 A
9. If 150 J of energy is incident on area 2 m^2. If $Q_r =$ 15 J, coefficient of absorption is 0.6, then amount of energy transmitted is
   a) 50 J b) 45 J c) 40 J d) 30 J
10. Radiations of intensity 0.5 Wm^{-2} are striking a metal plate. The pressure on the plate is
    a) 0.166×10^{-8} Nm^{-2} b) 0.332×10^{-8} Nm^{-2} c) 0.111×10^{-8} Nm^{-2} d) 0.083×10^{-8} Nm^{-2}
11. A charged particles oscillates about its mean equilibrium position with a frequency of 10^9 Hz. Frequency of the Electromagnetic Waves produced by the oscillator is
    a) 10 Hz b) 10^5 Hz c) 10^9 Hz d) 10^{10} Hz

12. The unit of expression $\mu_0\varepsilon_0$ are
    a) ms^{-1} b) m^2s^{-2} c) s^2m^{-2} d) sm^{-1}
13. A layer of ionosphere does not reflect waves with frequencies greater than 10 MHz; then maximum electron density in this layer is
    a) $1.23 \times 10^{11}\ m^{-3}$ b) $1.23 \times 10^{10}\ m^{-3}$ c) $12.3 \times 10^{10}\ m^{-3}$ d) $1.23 \times 10^{12}\ m^{-3}$
14. A point source of Electromagnetic radiation has an average power output of 1500 W. The maximum value of electric field at a distance of 3 m from this source in Vm^{-1} is
    a) 500 b) 100 c) $\frac{500}{3}$ d) $\frac{250}{3}$
15. A. The wavelength of microwaves is greater than that of UV-rays.
    B. The wavelength of IR rays is lesser than that of UV-rays.
    C. The wavelength of microwaves is lesser than that of IR-rays.
    D. Gamma rays have shortest wavelength in the Electromagnetic Spectrum.
    Of the above statements
    a) A and B are true b) B and C are true
    c) C and D are true d) A and D are true
16. If μ_0 is permeability of free space and ε_0 is permittivity of free space, the speed of light in vacuum is given by
    a) $\sqrt{\mu_0\varepsilon_0}$ b) $\sqrt{\frac{\mu_0}{\varepsilon_0}}$ c) $\sqrt{\frac{1}{\mu_0\varepsilon_0}}$ d) $\sqrt{\frac{\varepsilon_0}{\mu_0}}$
17. A plane electromagnetic wave of intensity 10 Wm^{-2} strikes a small mirror of area 20 cm^2, held perpendicular to the approaching wave. The radiation force on the mirror will be
    a) 6.6×10^{-11} N b) 1.33×10^{-11} N c) 1.33×10^{-10} N d) 6.6×10^{-10} N
18. A plane Electromagnetic Waves travels in free space along x-axis. At a particular point in space, the electric field along y-axis is 9.3 Vm^{-1}. The magnetic induction is
    a) $3.1 \times 10^{-8}\ T$ b) $3 \times 10^{-5}\ T$ c) $3 \times 10^{-6}\ T$ d) $9.3 \times 10^{-6}\ T$
19. Clouds are contained in a layer from the earth's surface, which is called
    a) Troposphere b) Stratosphere c) Mesosphere d) Ionosphere
20. The correct sequence of the increasing wavelength of the given radiation sources is
    a) Radioactive sources, X-ray tube, crystal oscillator, sodium vapour lamp
    b) Radioactive source, X-ray tube, sodium vapour lamp, crystal oscillator
    c) X-ray tube, radioactive source, crystal oscillator, sodium vapour lamp
    d) X-ray tube, crystal oscillator, radioactive source, sodium vapour lamp