DPP

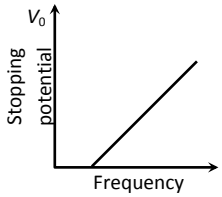
DAILY PRACTICE PROBLEMS

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

Topic :- Dual nature of radiation and matter

1. In photoelectric effect, the threshold wavelength of sodium is 5000 Å. Find its work function ($h = 6.6 \times 10^{-34}\ Js, c = 3 \times 10^{8}\ ms^{-1}, 1\ eV = 1.6 \times 10^{-19}\ J$)
   a) 7.5 eV b) 2.5 eV c) 10 eV d) 5.0 eV
2. An X-ray has a wavelength of 0.010 Å. Its momentum is
   a) $2.126 \times 10^{-23} kg\text{-}m/s$ b) $6.626 \times 10^{-22} kg\text{-}m/s$
   c) $3.456 \times 20^{-25} kg\text{-}m/s$ d) $3.313 \times 10^{-22} kg\text{-}m/s$
3. In the Davission and Germer experiment, the velocity of electrons emitted from the electron gun can be increased by
   a) Decreasing the potential difference between the anode and filament
   b) Increasing the potential difference between the anode and filament
   c) Increasing the filament current
   d) Decreasing the filament current
4. If an electron and a photon propagate in the form of waves having the same wavelength, it implies that they have the same
   a) Energy b) Momentum c) Velocity d) Angular momentum
5. When a high energy UV photon beam enters an electric field, it will be
   a) Accelerated b) Retarded c) Undeflected d) None of these
6. A metal surface of work function 1.07 eV is irradiated with light of wavelength 332 nm. The retarding potential required to stop the escape of photoelectrons is
   a) 1.07 eV b) 2.66 eV c) 3.7 eV d) 4.81 eV
7. When light falls on a metal surface, the maximum kinetic energy of the emitted photo-electrons depends upon
   a) The time for which light falls on the metal
   b) Frequency of the incident light
   c) Intensity of the incident light
   d) Velocity of the incident light
8. An X-ray tube is operated at 50 kV. The minimum wavelength produced is
   a) 0.5 Å b) 0.75 Å c) 0.25 Å d) 1 Å
9. The K_a X-ray emission line of tungsten occurs at $\lambda = 0.021nm$. The energy difference between K and L levels in this atom is about
   a) 0.51 MeV b) 1.2 MeV c) 59 KeV d) 13.6 eV

10. A photon of energy 3.4 eV is incident on a metal having work function 2 eV. The maximum KE of photoelectrons is equal to
    a) 1.4 eV b) 1.7 eV c) 5.4 eV d) 6.8 eV
11. A beam of 35.0 keV electrons strikes a molybdenum target, generating the X-rays. What is the cut-off wavelength?
    a) 35.5 pm b) 40.0 pm c) 15.95 pm d) 18.2 pm
12. The energy that should be added to an electron to reduce its de-Broglie wavelength from 1 nm to 0.5 nm is
    a) Four times the initial energy b) Equal to the initial energy
    c) Twice the initial energy d) Thrice the initial energy
13. A charged oil drop of mass $2.5 \times 10^{-7} kg$ is in space between the two plates, each of area $2 \times 10^{-2} m^2$ of a parallel plate capacitor. When the upper plate has a charge of $5 \times 10^{-7} C$ and the lower plate has an equal negative charge, the oil remains stationary. The charge of the oil drop is [Take $g = 10\ m/s^2$]
    a) $9 \times 10^{-1} C$ b) $9 \times 10^{-6} C$ c) $8.85 \times 10^{-13} C$ d) $1.8 \times 10^{-14} C$
14. The photoelectric effect can be understood on the basis of
    a) The principle of superposition b) The electromagnetic theory of light
    c) The special theory of relativity d) Line spectrum of the atom
15. The ratio of the de Broglie wavelengths of an electron of energy 10 eV to that of person of mass 66 kg travelling at a speed of 100 km/hr is of the order of
    a) 10^{34} b) 10^{27} c) 10^{17} d) 10^{-10}
16. By photoelectric effect, Einstein, proved
    a) $E = hv$ b) $K.E. = \frac{1}{2}mv^2$ c) $E = mc^2$ d) $E = \frac{Rhc^2}{n^2}$
17. A particle with rest mass m_0 is moving with speed of light c. The de-Broglie wavelength associated with it will be
    a) Infinite b) Zero c) $m_0 c/h$ d) $hv/m_0 c$
18. In the graph given below. If the slope is $4.12 \times 10^{-15} V\text{-}s$, then value of '$h$' should be



    a) $6.6 \times 10^{-31} J\text{-}s$ b) $6.6 \times 10^{-34} J\text{-}s$ c) $9.1 \times 10^{-31} J\text{-}s$ d) None of these
19. The wavelength of X-rays is
    a) 2000 Å b) 2 Å c) 1 mm d) 1 cm
20. If a cathode ray tube has a potential difference V volt between the cathode and anode, then the speed v of cathode rays is given by
    a) $v \propto V^2$ b) $v \propto \sqrt{V}$ c) $v \propto V^{-1}$ d) $v \propto V$