ARJUNA (NEET)

STRUCTURE OF ATOM

1. What is the work function (W_0) of the metal whose threshold frequency (v_0) is 5.2×10^{14} s^{-1}?
   (A) 3.44×10^{-19} J
   (B) 4.98×10^{-19} J
   (C) 5.67×10^{14} J
   (D) 9.96×10^{19} J

2. A 100 watt bulb emits monochromatic light of wavelength 400 nm. Calculate the number of photons emitted per second by the bulb.
   (A) 1.6×10^{19}
   (B) 2.9×10^{16}
   (C) 2.012×10^{20}
   (D) 4.42×10^{19}

3. Calculate the maximum kinetic energy of photoelectrons emitted when a light the frequency 2×10^{16} Hz irradiated on a metal surface with threshold frequency (v_0) equal to 8.68×10^{15} Hz.
   (A) 7.5×10^{-18} J
   (B) 4.2×10^{19} J
   (C) 2.9×10^{14} J
   (D) 10.6×10^{4} J

4. The threshold frequency v_0 for a metal is 8×10^{14} s^{-1}. What is the kinetic energy of an electron emitted having frequency $v = 1.0 \times 10^{15}$ s^{-1}.

5. A hot metal emits photons of light with energy 3.0×10^{-19} J. Calculate the frequency and wavelength of the photon?

6. Calculate the energy of photon of light having frequency of 2.7×10^{13} s^{-1}.

7. Calculate the energy of one mole of photons of radiation whose frequency is 5×10^{14} Hz.

8. Photoelectrons are removed with kinetic energy 1.8664×10^{-21} J, when photons of light with energy 4.23×10^{-19} J fall on the metal. What is the minimum energy required per mole to remove an electron from potassium metal?

9. The correct sequence of frequency of the electromagnetic radiations in electromagnetic spectrum is
   (A) X-rays > UV rays > Microwaves > Radio waves
   (B) Radio waves > Microwaves > UV rays > X-rays
   (C) UV rays > X-rays > Radio waves > Microwaves
   (D) Radio waves > Microwaves > X-rays UV rays

10. The kinetic energy of the photoelectrons depends upon the
    (A) Intensity of striking light
    (B) Number of photons striking
    (C) Frequency of striking light
    (D) Number of photoelectrons ejected

ANSWERS KEY

1. (A)
   Work function $(W_0) = 3.44 \times 10^{-19}$ J

2. (C)
   Number of photons emitted
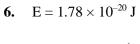 $= 2.012 \times 10^{20}$ photons per second

3. (A)
   7.5×10^{-18} J

4. 1.3252×10^{-19} J

5. $v = 4.52 \times 10^{14}$ s^{-1}
   $\lambda = 6.637 \times 10^{-7}$ m

6. $E = 1.78 \times 10^{-20}$ J

7. $E = 199$ kJ mol^{-1}

8. 253.6 kJ mol^{-1}

9. (A)

10. (C)

Note – If you have any query/issue

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