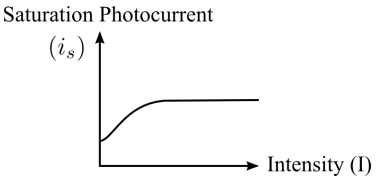
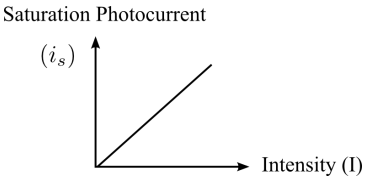
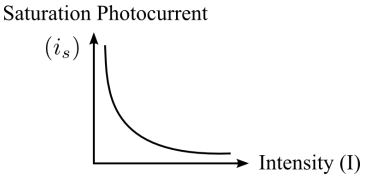
Physics

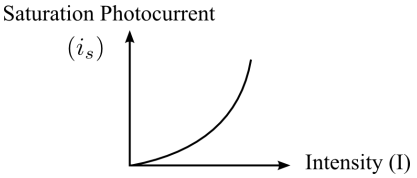
Single Correct Questions

1. Which of the following is the appropriate graph of saturation photocurrent V/s intensity of incident radiation on the emitter plate of a photocell ?

(A) 

(B) 

(C) 

(D) 

2. A Photocell is illuminated by a small bright source placed $1m$ away. When the same source of light is placed $\frac{1}{2}m$ away, the number of electrons emitted by photo cathode would.

(A) decrease by a factor of 4 (B) increase by a factor of 4

(C) decrease by a factor of 2 (D) increase by a factor of 2

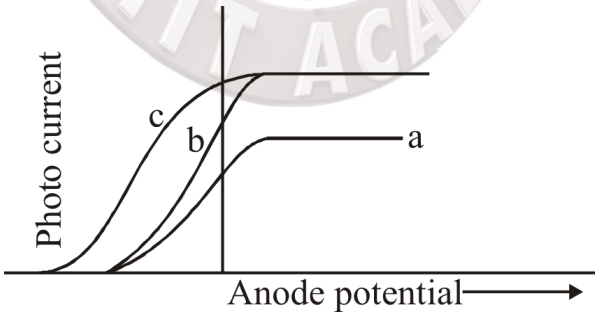
3. The work function of caesium is 2.14eV. Find the wavelength of the incident light if the photo current is brought to zero by a stopping potential of 0.60V.

(A) 150 nm (B) 450 nm (C) 850 nm (D) 1.5 nm

4. Let K_1 be the maximum kinetic energy of photoelectrons emitted by light of wavelength λ_1 and K_2 corresponding to wavelength λ_2. If $\lambda_1 = 2\lambda_2$ then

(A) $2K_1 = K_2$ (B) $K_1 = 2K_2$ (C) $K_1 < K_2/2$ (D) $K_1 > 2K_2$

5. Fig. shows the variation of photocurrent with anode potential for a photo-sensitive surface for three different radiations. Let I_a, I_b and I_c be the intensities and f_a, f_b and f_c be the frequencies for the curves a, b and c respectively. Which of the following facts is correct ?



(A) $f_a = f_b$ and $I_a \neq I_b$ (B) $f_a = f_c$ and $I_a = I_c$ (C) $f_a = f_c$ and $I_a = I_b$ (D) $f_b = f_c$ and $I_b = I_c$

6. $10^{-3}W$ of $5000\mathring{A}$ light is directed on a photoelectric cell. If the current in the cell is $0.16\mu A$, then the percentage of incident photons which produce photoelectrons is

(A) 0.4% (B) 0.04% (C) 20% (D) 10%

7. The frequency and the intensity of a beam of light falling on the surface of photoelectric material are increased by a factor of two. This will :

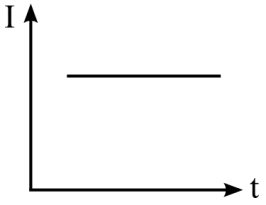
(A) Increase the maximum energy of the photoelectrons, as well as photoelectric current by a factor of two

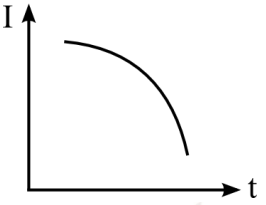
(B) Increase the maximum kinetic energy of the photo electrons and would increase the photoelectric current by a factor of two

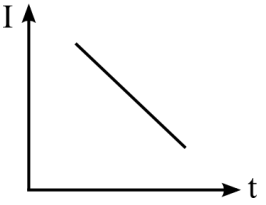
(C) Increase the maximum kinetic energy of the photoelectrons by a factor of greater than two and will have no effect on the magnitude of photoelectrinc current produced

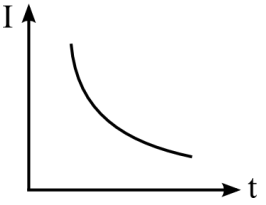
(D) Not produce any effect on the kinetic energy of the emitted electrons but will increase the photoelectric current by a factor of two

8. A point souce causes photoelectric effect from a small metal plate. Which of the following curves may represent the saturation photocurrent as a function of the distance between the source and the metal ?

(A) 

(B) 

(C) 

(D) 

Integer Type Questions

9. Light of wavelength 330 nm falling on a piece of metal ejects electrons with sufficient energy which requires voltage V_0 to prevent them from reaching a collector. In the same setup, light of wavelength 220 nm, ejects electrons which require twice the voltage V_0 to stop them in reaching a collector. The numerical value of voltage V_0 is $\frac{15}{x}V$. Find value of x.

Multiple Correct Questions

10. The cathode of a photocell is illuminated with a light of increasing frequency. The anode current will start at a frequency $3 \times 10^{14} Hz$. A capacitor with capacitance $1\ pF$ is connected between the anode and the cathode of this photocell and the cathode is illuminated with light of wavelength 425nm.

(A) Work function of metal is approximately $2 \times 10^{-19} J$

(B) Work function of metal is approximately $3 \times 10^{-19} J$

(C) The charge on the capacitor in steady state is $1.67 \times 10^{-12} C$

(D) The charge on the capacitor in steady state is $2.92 \times 10^{-12} C$