Q2: When a certain photosensitive surface is illuminated with monochromatic light of frequency f, the stopping potential for the photocurrent is ($-V_0/2$). When the surface is illuminated by monochromatic light of frequency f/2, the stopping potential is $-V_0$. The threshold frequency for photoelectric emission is

(a) 4f/3

(b) 2f

(c) 5f/3

(d) 3f/2

Solution

$hf = \Phi + (v_0/2)e$----(1)

$hf/2 = \Phi + v_0e$----(2)

(½) = $(hf - \Phi)/(((hf/2) - \Phi)$

$hf_0 = (3/2)hf$ (since $\Phi = hf_0$)

$f_0 = (3/2)f$

Answer: (d) 3f/2