Q 5 When the wavelength of radiation falling on a metal is changed from 500 nm to 200 nm, the maximum kinetic energy of the photoelectrons becomes three times larger. The work function of the metal is close to : **[Main Sep. 03, 2020 (I)]**

(a) 0.81 eV (b) 1.02 eV (c) 0.52 eV (d) 0.61 eV

ANS **(d)** Using equation, $= \frac{hc}{\lambda} - \phi$

$$KE_{max} = \frac{hc}{\lambda} - \phi = \frac{hc}{500} - \phi \qquad ...(1)$$

Again, $$3KE_{max} = \frac{hc}{200} - \phi \qquad ...(2)$$

Dividing equation (2) by (1), $$\frac{3KE_{max}}{KE_{max}} = \frac{3}{1} = \frac{\frac{hc}{200} - \phi}{\frac{hc}{500} - \phi}$$

Putting the value of $hc = 1237.5$ and solving we get, work function, $\phi = 0.61$ eV.