Q 5 A metal plate of area $1 \times 10^{-4}\ m^2$ is illuminated by a radiation of intensity $16\ mW/m^2$. The work function of the metal is 5 eV. The energy of the incident photons is 10 eV and only 10% of it produces photo electrons. The number of emitted photo electrons per second and their maximum energy, respectively, will be:

[$1\ eV = 1.6 \times 10^{-19}\ J$] **[Main 10 Jan. 2019 (II)]**

(a) 10^{14} and 10 eV (b) 10^{12} and 5 eV

(c) 10^{11} and 5 eV (d) 10^{10} and 5 eV

ANS (c) using, intensity $I = \frac{nE}{At}$

n = no. of photoelectrons

$$\Rightarrow 16\times10^{-3} = \left(\frac{n}{t}\right)\times\frac{10\times1.6\times10^{-19}}{10^{-4}} \text{ or, } \frac{n}{t} = 10^{12}$$

So, effective number of photoelectrons ejected per unit time = $10^{12} \times 10/100 = 10^{11}$