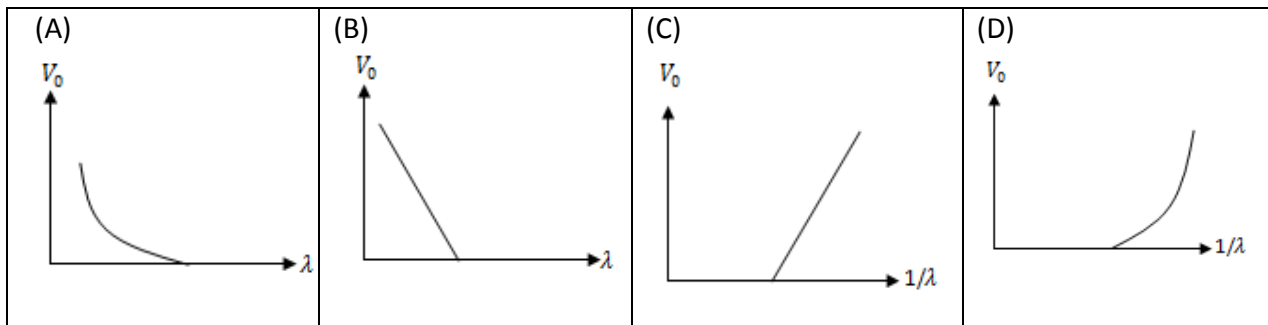18. For photo-electric effect with incident photon wavelength λ, the stopping potential is V_0. Identify the correct variation(s) of V_0 with λ and $1/\lambda$.

Answer: We know in photo electric effect, when energy incident part of this incident energy is used to eject the electron and rest part is used for providing kinetic energy.

[For detail refer http://selfstudy.in/HSEPhysics/EinsteinsPhotoElectricEquation.pdf]

Here $h\nu_0 = work\ function = constant\ (\nu_0\ is\ thershold\ frequencey) = \phi_0$.
$eV_s = eV_0, V_s = V_0 = Stopping\ potential\ (\ potetial\ to\ stop\ electron\ from\ emission)$

$h\nu = h\nu_0 + eV_s$
$or\ h\dfrac{c}{\lambda} = h\nu_0 + eV_s$
$or\ h\dfrac{c}{\lambda} = \phi_0 + eV_0$

$or\ V_0 = \dfrac{hc}{e\lambda} - \dfrac{\phi_0}{e}$

Thus with the λ increase value of V_0 will fall and fall is not straight line bit convex towards origin resembling to graph (A).

If we plot $1/\lambda$ along X –axis with the increase of $1/\lambda$, V_0 will increase, resembling to graph (C)

Correct Options are (A), (C).