Calculate the smallest wavelength of radiation that may be emitted by (a) hydrogen, (b) He$^+$ and (c) Li^{++}.

Small wave length is emitted i.e. longest energy

$n_1 = 1, n_2 = \infty$

a) $\dfrac{1}{\lambda} = R\left(\dfrac{1}{n_1^2 - n_2^2}\right)$

$\Rightarrow \dfrac{1}{\lambda} = 1.1 \times 10^7 \left(\dfrac{1}{1} - \dfrac{1}{\infty}\right)$

$\Rightarrow \lambda = \dfrac{1}{1.1 \times 10^7} = \dfrac{1}{1.1} \times 10^{-7} = 0.909 \times 10^{-7} = 90.9 \times 10^{-8} = 91 \text{ nm}.$

b) $\dfrac{1}{\lambda} = z^2 R\left(\dfrac{1}{n_1^2 - n_2^2}\right)$

$\Rightarrow \lambda = \dfrac{1}{1.1 \times 10^{-7} z^2} = \dfrac{91 \text{ nm}}{4} = 23 \text{ nm}$

c) $\dfrac{1}{\lambda} = z^2 R\left(\dfrac{1}{n_1^2 - n_2^2}\right)$

$\Rightarrow \lambda = \dfrac{91 \text{ nm}}{z^2} = \dfrac{91}{9} = 10 \text{ nm}$