For $N_2$: $A = 28 \Rightarrow m = 28u$

$$m = 28u\left(\frac{1.66\times10^{-27}\,kg}{1u}\right) = 4.65\times10^{-26}\,kg$$

$$T = 20^\circ C = 293\,K \;;\; k_B = 1.38\times10^{-23}\,\frac{J}{K}$$

$$v_{mp} = \sqrt{\frac{2k_BT}{m}} = \underline{417\ m/s}$$

$$v_{avg} = \sqrt{\frac{8k_BT}{\pi m}} = \underline{470\ m/s}$$

$$v_{rms} = \sqrt{\frac{3k_BT}{m}} = \underline{511\ m/s}$$

NOTE: $v \propto \frac{1}{\sqrt{m}}$ for all these speeds.

So: $$\frac{v_{H_2}}{v_{N_2}} = \sqrt{\frac{m_{N_2}}{m_{H_2}}} \Rightarrow v_{H_2} = v_{N_2}\sqrt{\frac{m_{N_2}}{m_{H_2}}}$$

and $$\frac{m_{N_2}}{m_{H_2}} = \frac{28}{2} = 14$$

$\therefore$ $$(v_{mp})_{H_2} = (v_{mp})_{N_2}\sqrt{14} = \underline{1560\ m/s}$$

$$(v_{avg})_{H_2} = (v_{avg})_{N_2}\sqrt{14} = \underline{1759\ m/s}$$

$$(v_{rms})_{H_2} = (v_{rms})_{N_2}\sqrt{14} = \underline{1912\ m/s}$$