

Name: ANSELMO Date: _____
 Group Members: _____ Group: _____

End-Corrected

1. 1929's simplified, experimental 1.014 "air-bending" hot plate broke the one-world record speed record in its class with two flights on Nov. 14, 1929. The hot plate, known as a "sawyer", broke its class by: (a) the use of hydrogen; (b) without the usual heavy loads of weight; (c) making (and) landing it from its wings from the air, which is usually accomplished by the forward speed of the vehicle and the shape of the air with a conventional airplane from starting. (Notice its comparison to the airplane from its look during launch. The hot plate achieved a record speed of 104 ft/sec.

(a) Convert the speed in miles per hour to feet per second. (SHOW ALL WORK)

$$104 \text{ mi/hr} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} = \frac{104 \text{ mi}}{1 \text{ hr}} = 549,120 \frac{\text{ft}}{\text{hr}} \text{ convert to } \frac{549,120 \text{ ft}}{3600 \text{ sec}} \text{ (or 152.53 mph)}$$

(b) Convert the speed in kilometers per hour to meters per second. (SHOW ALL WORK)

$$104 \text{ km/hr} = \frac{104 \text{ km}}{1 \text{ hr}} = \frac{104 \text{ km}}{3600 \text{ sec}} = \frac{104 \cdot 1000 \text{ m}}{3600 \text{ sec}} = \frac{104,000 \text{ m}}{3600 \text{ sec}} = \frac{104,000 \text{ m}}{3600 \text{ sec}} \cdot \frac{1 \text{ sec}}{1 \text{ sec}} = 29.17 \frac{\text{m}}{\text{sec}} \text{ (or 104 km/hr)}$$

2. Calculate the energy of a proton (1.67 x 10⁻²⁷ kg) moving at the same velocity as the 1.014 hot plate. (SHOW ALL WORK)

$$K = \frac{1}{2} m v^2 = \frac{1}{2} (1.67 \times 10^{-27} \text{ kg}) (29.17 \text{ m/s})^2 = \left(\frac{1.67 \times 10^{-27} \text{ kg}}{2} \right) (29.17 \text{ m/s})^2$$

$$= 7.36 \times 10^{-27} \text{ kg} \cdot \frac{\text{m}^2}{\text{s}^2} = \frac{1.67 \times 10^{-27} \text{ kg}}{2} = 8.35 \times 10^{-28} \text{ kg} \cdot \frac{\text{m}^2}{\text{s}^2}$$

3. Calculate the kinetic energy of the proton in eV. (The kinetic energy of a proton is 1.60 x 10⁻¹⁹ J. What is the kinetic energy of the proton? (SHOW ALL WORK)

$$K = 8.35 \times 10^{-28} \frac{\text{kg} \cdot \text{m}^2}{\text{s}^2} = \frac{1.60 \times 10^{-19} \text{ J}}{1.60 \times 10^{-19} \text{ J}} = 1.60 \times 10^{-19} \frac{\text{J}}{1.60 \times 10^{-19} \text{ J}} = \frac{8.35 \times 10^{-28} \text{ kg} \cdot \text{m}^2/\text{s}^2}{1.60 \times 10^{-19} \text{ J}}$$

$$= 5.22 \times 10^{-9} \text{ eV}$$