Homework5 for GPI

1. KK 4.3 (5.3)
2. KK 4.5 (5.5)
3. KK 4.7 (5.7)
4. KK 4.9

   4.9 A simple and very violent chemical reaction is $H + H \rightarrow H_2 + 5$ eV. (1 eV $= 1.6 \times 10^{-19}$ J, a healthy amount of energy on the atomic scale.) However, when hydrogen atoms collide in free space they simply bounce apart! The reason is that it is impossible to satisfy the laws of conservation of momentum and conservation of energy in a simple two body collision which releases energy. Can you prove this? You might start by writing the statements of conservation of momentum and energy. (Be sure to include the energy of reaction in the energy equation, and get the sign right.) By eliminating the final momentum of the molecule from the pair of equations, you should be able to show that the initial momenta would have to satisfy an impossible condition.

5. KK.4.10 (5.9)
6. KK 4.11 (5.10) (this is basically a Momentum-Impulse problem)
7. KK 4.13 (5.12)
8. KK. 4.15 (5.14)
9. KK 4.17 (5.16)
10. KK. 4.20 (5.18)
11. KK.4.21 (5.19)