Chapter 40 Relativity II (Examples) (SM02)

Example 1: Object 1 is moving at 0.98 c when it collides with object 2 which is at rest. They have an inelastic collision. What is the speed of the lump after the collision if object 2 has three times the rest mass of object 1?

Example 2: An electron has a head on collision with a proton (.98 c) and both stop. What is initial speed of the electron? [Binomial expansion: $(1 + x)^n = 1 + n\,x$ x very small]

Example 3: An electron has speed .86 c. What radial force is required to keep it moving in a circle of radius 1 m?

Example 4: An electron's speed increases from 2×10^6 to 2×10^8 m/s. By what factor does its kinetic energy increase? (do the calculation both classically and relativistically)

Example 5: A proton's speed is .5 c. At what speed will an electron have the same kinetic energy?

Example 6: How much energy is required to accelerate a 100000 kg spaceship from rest to 0.98 c?