**Chapter-38**

1. In a laboratory frame of reference, an observer notes that Newton’s second law is valid. Assume forces and masses are measured to be the same in any reference frame for speeds small compared with the speed of light. (a) Show that Newton’s

second law is also valid for an observer moving at a constant speed, small compared with the speed of light, relative to the laboratory frame. (b) Show that Newton’s second law is *not* valid in a reference frame moving past the laboratory frame

with a constant acceleration.

Ans:

1. Shannon observes two light pulses to be emitted from the same location, but separated in time by 3.00 *μ*s. Kimmie observes the emission of the same two pulses to be separated in time by 9.00 μs. (a) How fast is Kimmie moving relative to

Shannon? (b) According to Kimmie, what is the separation in space of the two pulses?

Ans:

1. (a) Find the kinetic energy of a 78.0-kg spacecraft launched out of the solar system with speed 106 km/s by using the classical equation $k=\frac{1}{2}mu^{2}$ . (b) **What If?** Calculate its kinetic energy using the relativistic equation. (c)  Explain the result of comparing the answers of parts (a) and (b).

Ans: