※ 考生請注意：本試題不可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. Assume that an object is attached to a spring and moving on a horizontal, frictionless surface. Through the classical transformation laws, show that the equations of motion of the object are the same as determined by an observer at rest with respect to the surface and by a second observer moving with constant velocity along the direction of the spring. (25%)

2. How fast does a rocket have to go for its length to be contracted to 98% of its rest length? (25%)

3. Find the frequency of the photon created when an electron of 10 keV is brought to rest in a collision with a heavy nucleus. (25%)

4. Describe the Fermi-Dirac distribution function versus energy for $T \approx 0$ K and draw a graph for such distribution. (25%)