※ 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. Suppose that Alice has a clock that is located at distance *r* from an observer, Bob. Detail how Alice's clock can be *synchronized* with Bob's clock. (25%)

2. A train 0.5 mile long, as measured by an observer, Alice, on the train, is traveling at a speed of 100 mi/hr. An observer, Bob, on the ground observes that two lightning bolts strike the ends of the train simultaneously. What is the *time separation* as measured by Alice? (25%)

3. Suppose that two objects with identical rest mass approach each other with equal speeds. They collide and stick together in an ideally inelastic collision. What is the *rest mass* of such composite object? (25%)

4. Silver has a Fermi energy of 5.5 eV and a work function of 4.6 eV at 0 K. Determine the *average electrostatic potential energy* seen by the free electrons in silver. (25%)