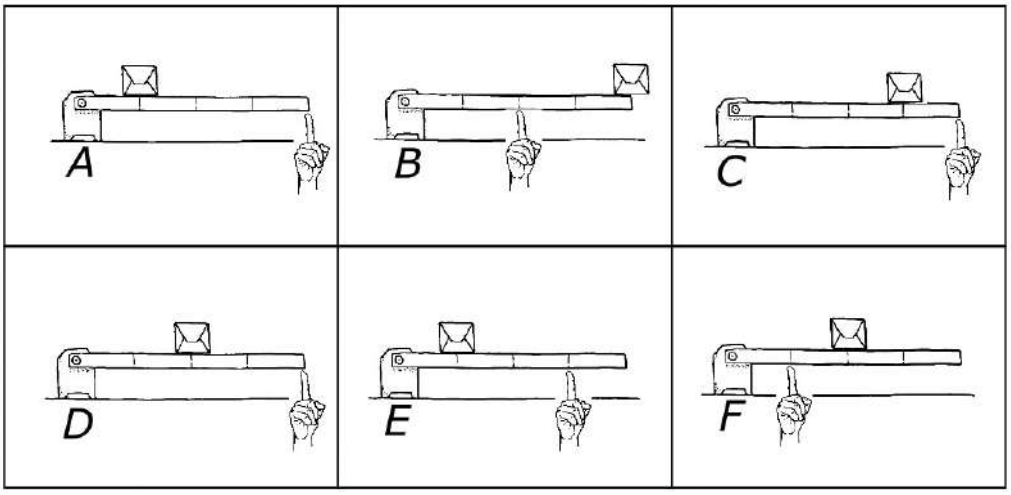
NAME _____ DATE _____

Scenario

A long rod of length L and negligible mass supports a box of mass M. The left end of each rod is held in place by a frictionless pin about which it can freely rotate. In each case, a vertical force is holding the rods and the weights at rest. The rods are marked at half-meter intervals.



Data Analysis

PART A: Rank the magnitude of the vertical force F applied to the rods to keep the rod horizontal.

Greatest Force F _____, _____, _____, _____, _____ Smallest Force F

Explain your ranking.

Using Representations

PART B: On the diagrams above, sketch the forces acting on the rod-box system. The forces that are internal to the system can be ignored.

Argumentation

PART C: In which cases is the force from the pin up? Down? Zero? Justify your answers.

Force from pin is ***up*** in case(s): _____

Force from pin is ***down*** in case(s): _____

Force from pin is ***zero*** in case(s): _____

PART D: Explain in a short paragraph with reference to the picture above why it is easier to hang a shopping bag from the crook of your elbow than to carry it suspended from your hand with your arm at a 90-degree angle.