

Problem 3 (25 points)

Shown below is a conducting rod that is movable on a U-shaped conducting rail. The rod and rail sit inside a uniform magnetic field created by an electromagnet. The magnetic field is pointing out of the paper plane. There is a constant, counter-clockwise current flowing in the loop formed by rod and rail, even though there is no battery or power supply connected to them.

- (a) Is the rod sitting still or moving? If it is moving, which direction is it moving in? If it is moving, is it moving at a constant velocity or accelerating? Explain your answers!
- (b) Suppose the rod was sitting still and there was no current in the loop formed by rod and rail. If then the electromagnet was switched off, such that the magnetic field rapidly dropped to 0, what would happen to the rod? Explain your answer.

