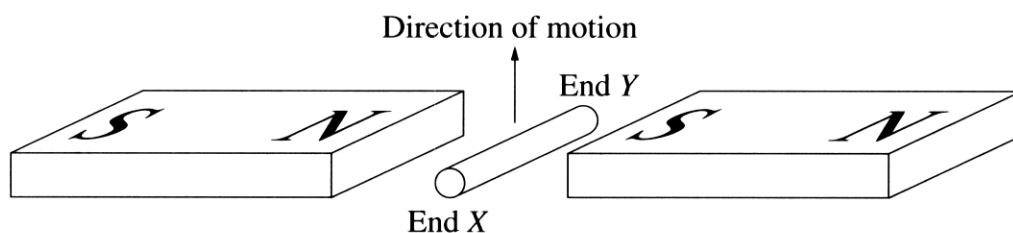


Question 23 (7 marks)

- (a) State Lenz's law. 1
 that ~~a rod~~ ^{a conductor/coil} passed into a magnetic field will produce a current that opposes the force that induced it
- (b) When the metal rod is moved upwards through the magnetic field as shown in the diagram, an emf is induced between the two ends.



- (i) Which end of the rod is negative? 1

End X becomes negative

- (ii) Explain how the emf is produced in the rod. 3

As the rod passes ~~between~~ ^{through} the field the positive and negative charges move to opposite ends of the rod (Right hand push rule Y becomes +, X becomes -) therefore you have a positive and negative terminal. The Mechanical work of moving the rod creates electrical potential energy. if a circuit is attached a current will flow while the rod is cutting flux lines

$F = qvB$

- (c) Explain how the principle of induction can be used to heat a conductor. 2

by passing an alternating current through ~~the~~ a wire (solenoid) near the conductor, the changing magnetic fields will cause eddy currents to form as the current passes back and forth the energy will be dissipated as heat energy