

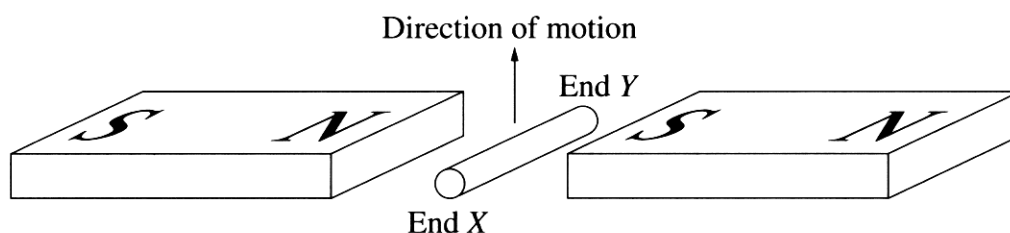
## Question 23 (7 marks)

- (a) State Lenz's law.

1

The induced current is such that the force it creates, opposes the change that gives rise to 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 Y

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

3

An EMF is produced in the rod when the induced current is proportional to the rate of change of flux through the circuit. When the rod is inserted into the magnetic field, an emf is produced.

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

2

When a conductor is heated, the amount of charge produced is increased, as induction involves the conversion of mechanical energy to electrical energy.