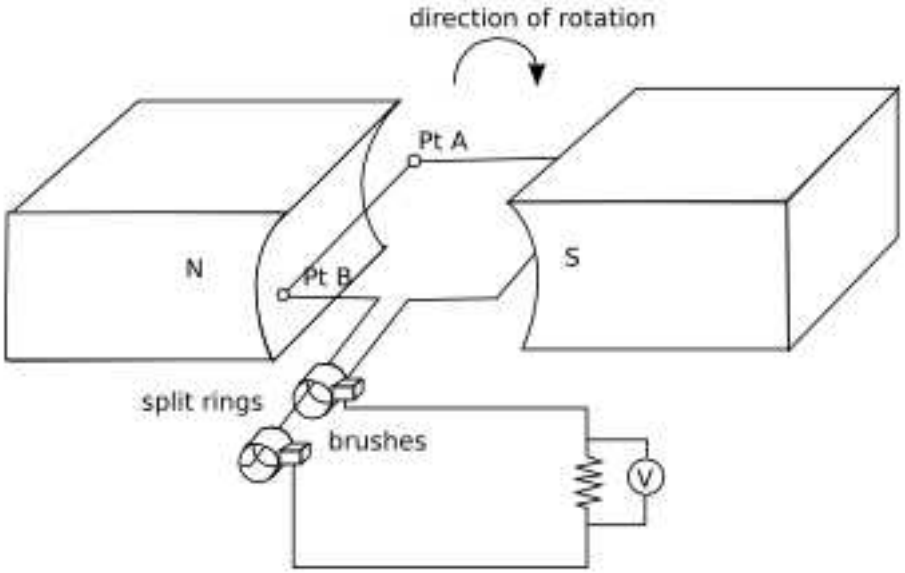
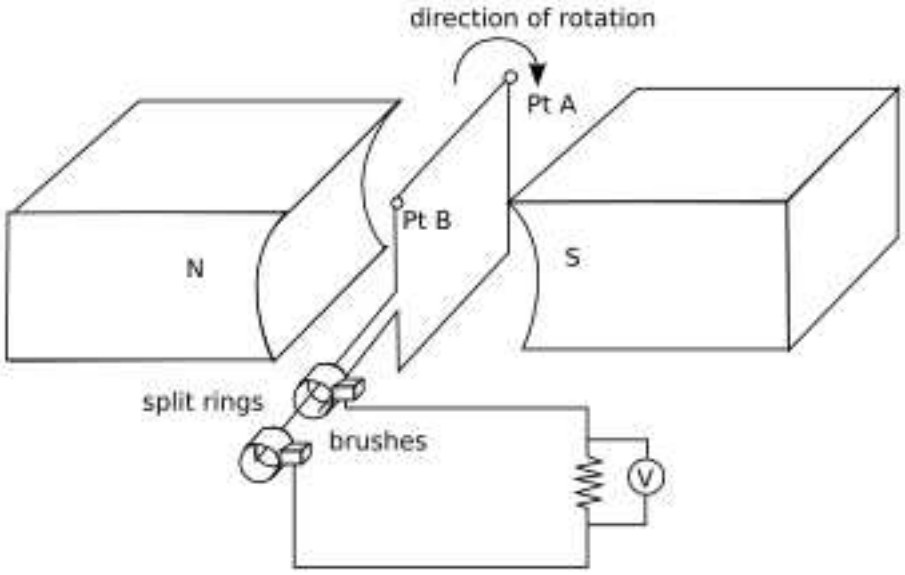
Secondary 4 Express Akmal bin Abd Rahman
Electromagnetic Induction: AC Generator October 21, 2005

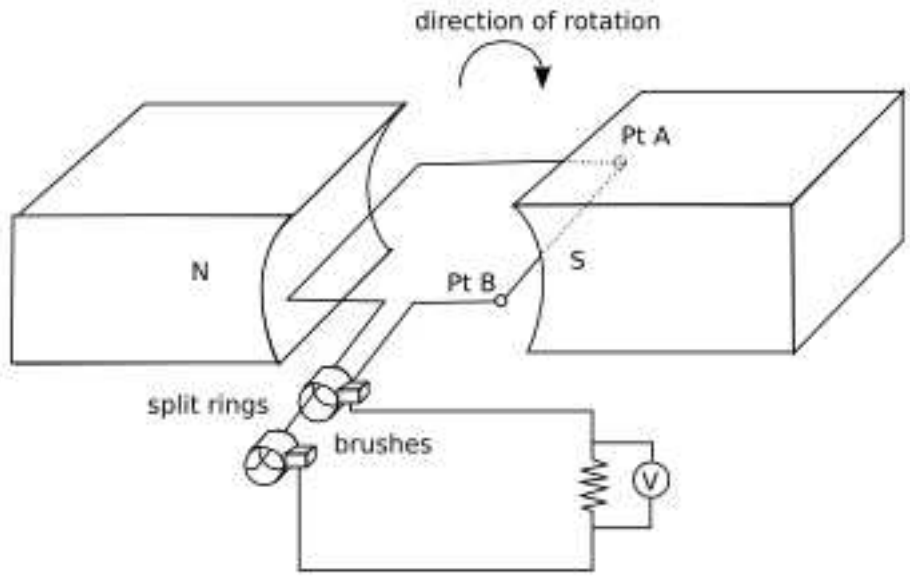
In the diagram below, you will see a model of an AC Generator which is turning clockwise. The AC Generator has undergone a 0° clockwise rotation.



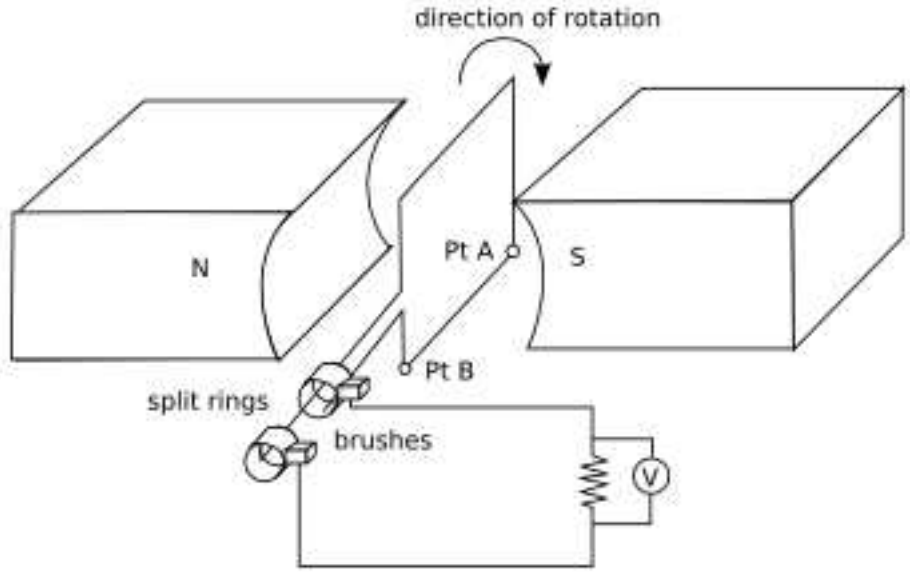
The AC Generator has undergone a 90° clockwise rotation.



The AC Generator has undergone a 180° clockwise rotation.



The AC Generator has undergone a 270° clockwise rotation.



For each of the four scenarios, can you hypothesis using Lenz's Law:

1. Just before reaching the position shown in the four diagrams above, which direction is the magnetic field going through the loop formed by the conducting wire? Will the magnetic field be increasing or decreasing as the loop continues its rotation?

2. Just after going past the position shown in the four diagrams above, which direction is the magnetic field going through the loop? Will the magnetic field by increasing or decreasing as the loop continues its rotation?

3. Therefore, which direction will the current be induced just before and just after the positions shown above?

4. At which positions will the induced current change direction just before and just after that position? In which positions will the induced current remain the same direction?

5. Can you plot a graph of voltage over time of one rotation of the loop? The polarity of the e.m.f. depends on the direction of induced current. (Consider the magnitude of the current to be greatest at the positions shown above in which the induced current do not change direction. Can you figure out why?)