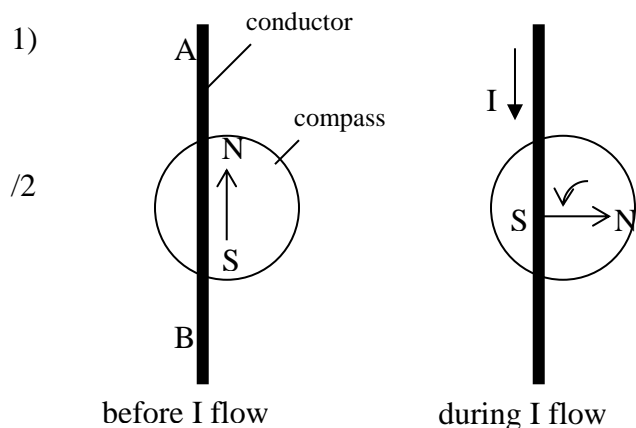


Physics 30 – Lesson 19

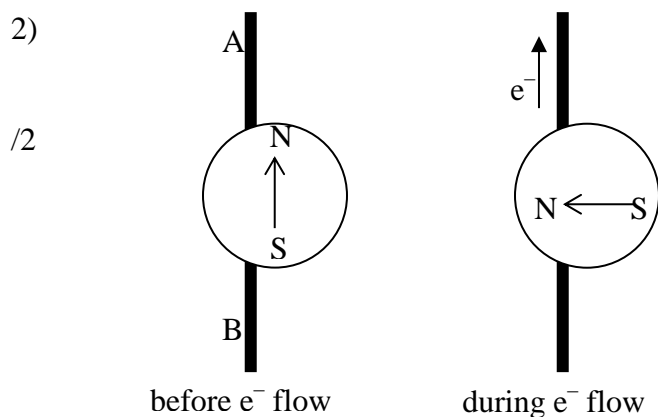
Magnetic Fields

/60

Part A



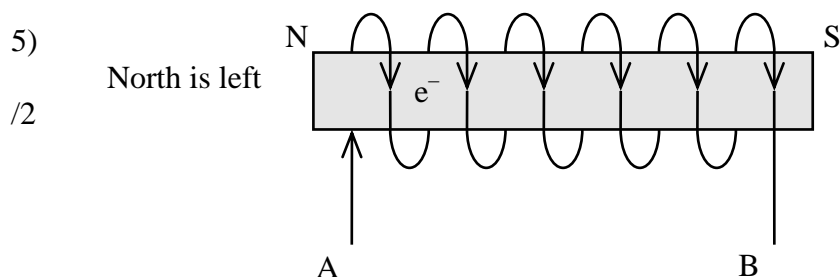
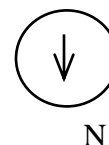
The Right Hand Rule predicts that the compass needle deflects and points to the **right**.



The Left Hand Rule predicts that the compass needle deflects and points to the **left**.

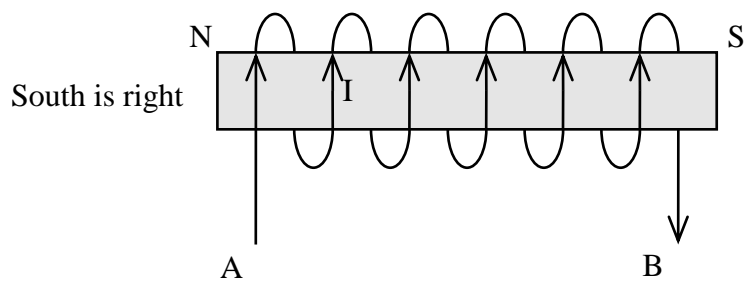
3) Using the right hand rule, the fingers curl around the wire and the thumb indicates that the current must be flowing from B to A.

4) Using the right hand rule, the thumb points out of the page and the fingers curl around the wire in a counterclockwise direction. At Point P the magnetic field is pointing down the page.



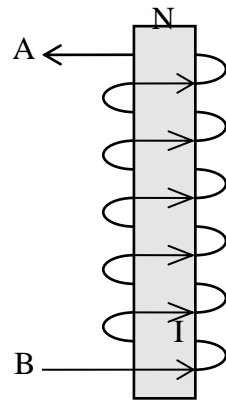
6)

/2



7)

/2

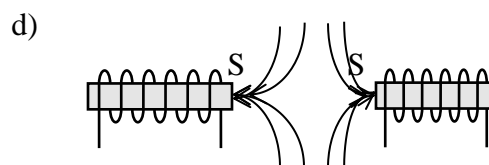
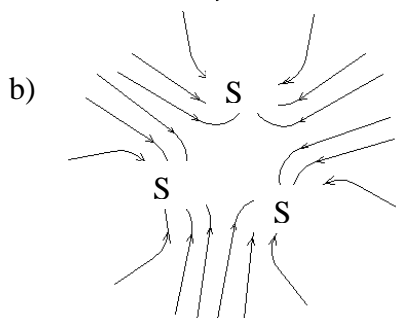
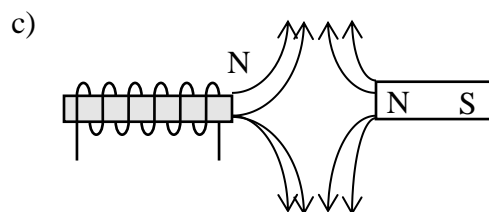
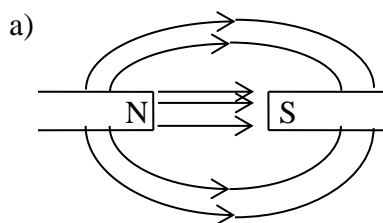


current flows
from B to A

Part B

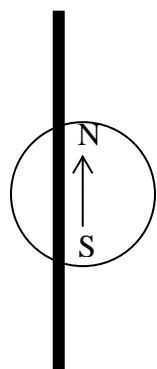
1)

/4

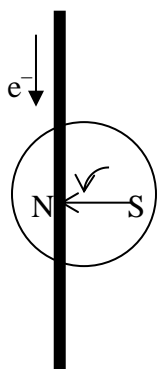


2)

/2



before e^- flow

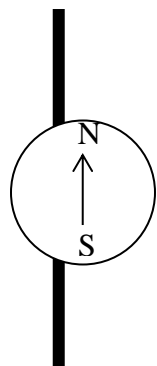


during e^- flow

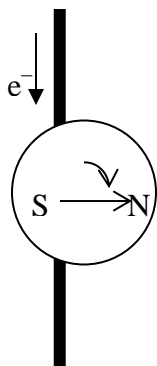
The Left Hand Rule predicts that the compass needle deflects **counterclockwise** as seen from above.

3)

/2



before e^- flow

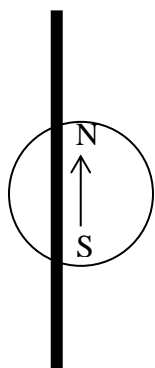


during e^- flow

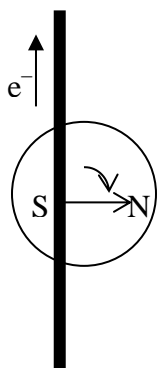
The Left Hand Rule predicts that the compass needle deflects **clockwise** as seen from above.

4)

/2



before e^- flow

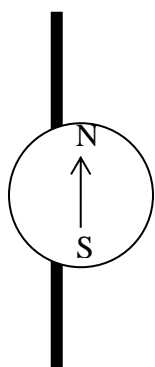


during e^- flow

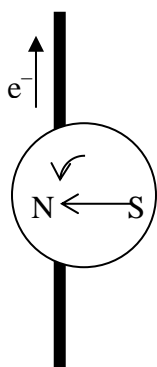
The Left Hand Rule predicts that the compass needle deflects **clockwise** as seen from above.

5)

/2



before e^- flow

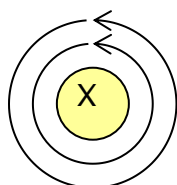


during e^- flow

The Left Hand Rule predicts that the compass needle deflects **counterclockwise** as seen from above.

6)

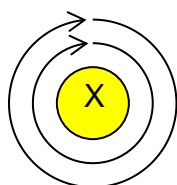
/2



Receding negatively charged bullet – left hand rule – counterclockwise magnetic field

7)

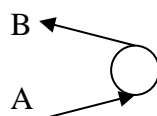
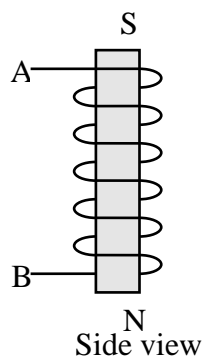
/2



Receding positively charged bullet – right hand rule – clockwise magnetic field

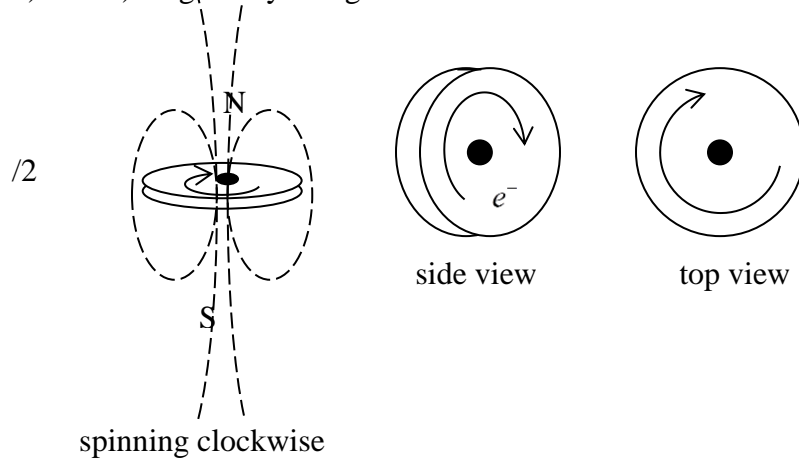
8)

/2



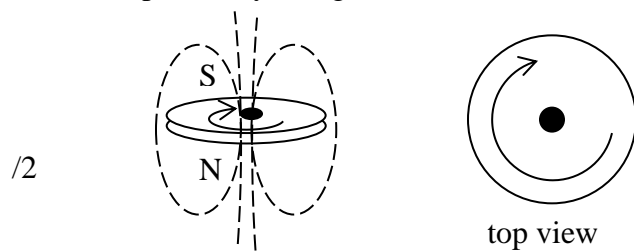
Counterclockwise electron flow (left hand rule). North pole of magnetic field is at the Bottom of the coil.

9) a) negatively charged disc

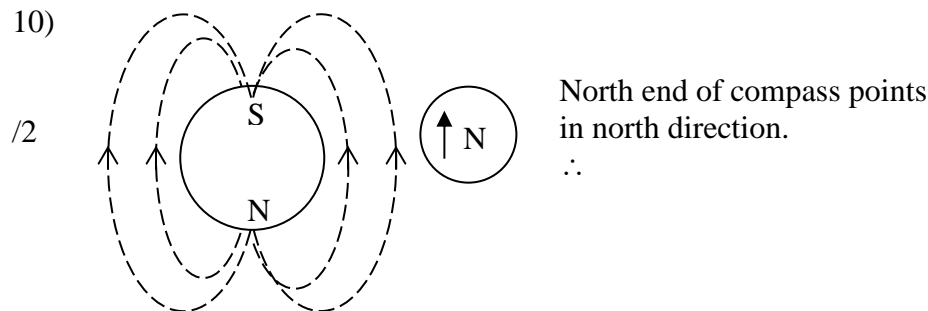


Electrons spinning clockwise will have the same effect as electrons flowing clockwise around a coil. Use the Left Hand Rule and the North Pole generated is up towards you as seen from above.

b) positively charge disc



Positive charged spinning clockwise will have the **opposite effect** to that of electrons spinning clockwise. Use the Right Hand Rule and the North pole generated is down away from you as seen from above.



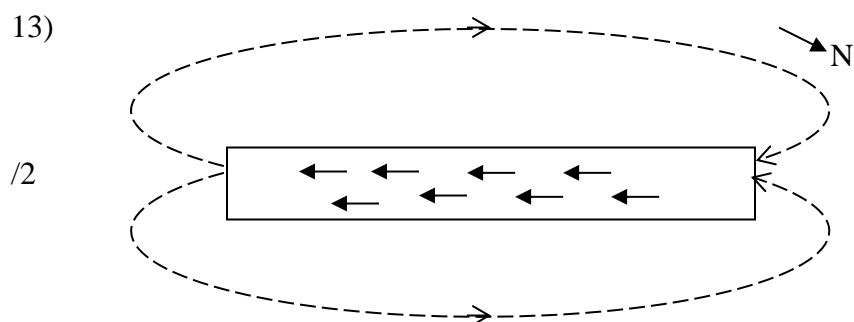
11)

/6

- a) at NMP (north magnetic pole)
 - compass will spin freely trying to point down into the Earth
- b) at SMP
 - compass will spin freely trying to point up from the Earth
- c) at equator
 - compass points north

- 12) Buildings are constantly being vibrated by winds, cars driving by, people walking inside the building, etc. The resulting vibrations of magnetic domains in the metal line up with the Earth's magnetic field resulting in the metals become permanent magnets themselves.

/2



/2

- 14) Sources of fields:

- electric – charges
- magnetic – spinning charges, moving charges
- gravitation – masses

/3

- 15)
- Ferromagnetic substances are composed of a large number of tiny regions called “magnetic domains.”
 - Each domain behaves like a tiny bar magnet.
 - When the material is not magnetized the domains are randomly aligned so their magnetic effects cancel each other out
 - When non-magnetized ferromagnetic material is exposed to a strong magnetic field, the domains turn and align themselves temporarily. The metal acts as a magnet for a short time.

/4

16)

Gravitational	Electric	Magnetic
-Non polar -Always attracts -Masses vector field -Decreases strength with distance -Field lines originate from a mass(es)	-Polar -Attracts and repels -Charges vector field -Decreases strength with distance -Field lines originate from a charge(s)	-Bi-polar -Attracts and repels -Magnets vector field -Decreases strength with distance -Field lines are closed loops, without beginning or end

/4

- 17) Vector fields have a direction, scalar fields do not.

/1