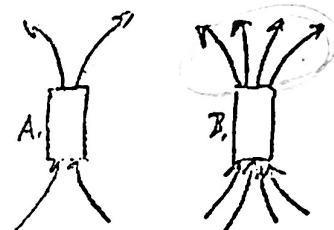


*Note: except for the steel guitar strings (which are magnetizable), all other wires and coils are made of copper (which is not magnetic).

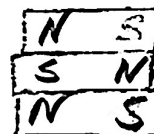
1. What is the symbol for magnetic field?
a. M **b. B** c. I d. F e. E

2. Compared to magnet A, magnet B is
a. The same strength **b. 2x stronger** c. 1/2 as strong d. 4x stronger e. 1/4 as strong

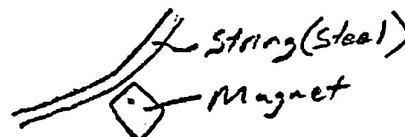


3. A compass needle is a small magnet. Which of the compass' poles points in the general direction of the Earth's North Geographic Pole?
a. The needle's north pole b. The needle's south pole

4. The diagram on the right shows three magnets sticking together. What magnetic pole is in the position of the question mark?
a. South b. North c. Not enough information



5. Which pole of the magnet is closest to the steel guitar string?
a. North b. South **c. Not enough information**

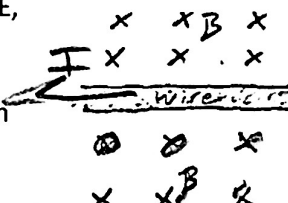


6. When the right hand rule is applied with curled fingers, what indicates the direction of current?
a. Palm **b. Thumb** c. Fingers

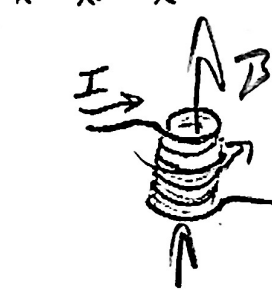
7. When the right hand rule is applied with curled fingers, what indicates the direction of the magnetic field?
a. Palm b. Thumb **c. Fingers**

8. When the right hand rule is applied with straight fingers, what indicates the direction of the force applied to a moving charge?
a. Palm b. Thumb c. Fingers

9. What direction does the letter "X" represent?
a. Up b. down **c. into the paper** d. out of the paper e. NE, SE, NW, and SW

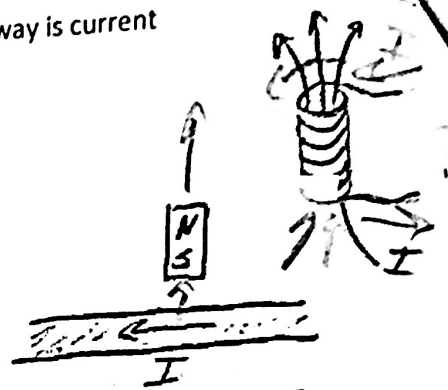


10. Given the magnetic field, B, what is the direction of the current in the wire on the right?
a. Leftward b. rightward

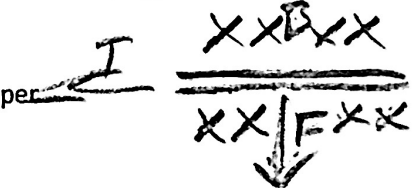


11. What is the direction of the magnetic field inside the solenoid?
A. **upward**
B. Downward

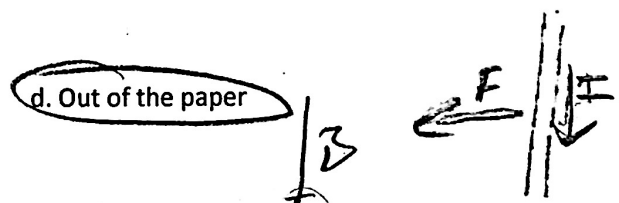
12. Relative to an observer looking downward through the solenoid, which way is current traveling?
 a. Clockwise **b. Counter-Clockwise**



13. What is the direction of the force acting on the wire?
 a. Upward (Toward the top margin of this paper)
 b. Downward (toward the bottom margin of this paper)
c. Into the paper
 d. Out of the paper
 e. Leftward

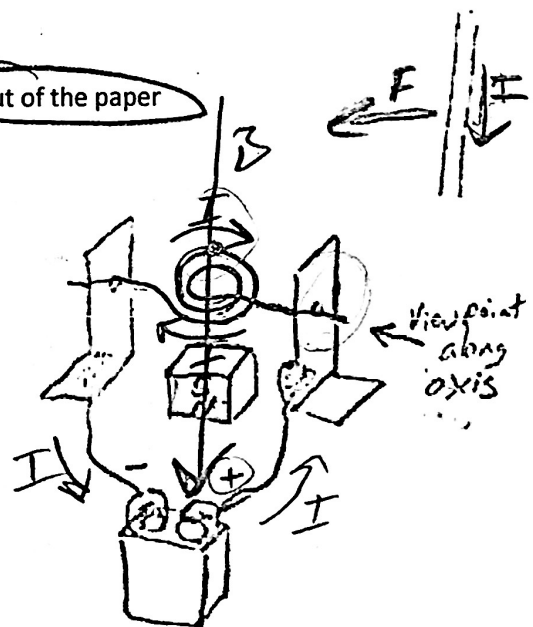


14. What is the direction of the current traveling through the wire?
A. Leftward B. Rightward C. Into the Paper d. Out of the paper

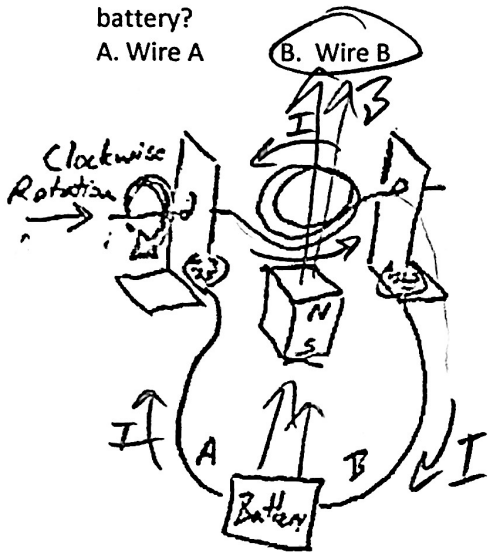


15. What is the direction of the magnetic field?
 A. Leftward B. Rightward C. Into the Paper **d. Out of the paper**

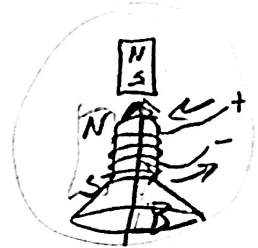
16. In which direction will the motor rotate when viewed along the axle in the indicated direction?
A. Clockwise B. Counter-Clockwise



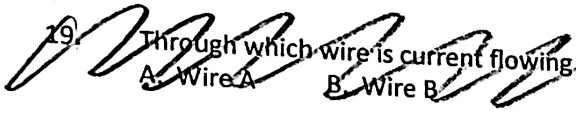
17. As the generator coil is rotated clockwise (when viewed as shown), through which wire does current flow into the battery?
 A. Wire A **B. Wire B**



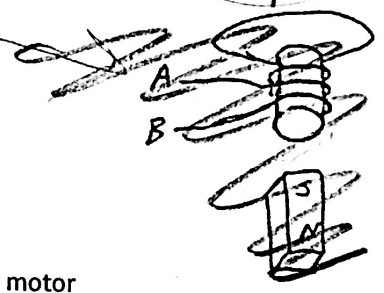
18. In which direction will the voice coil and speaker be pushed by the permanent magnet?
 A. Upward B. Downward C. Leftward
 D. Rightward E. Clockwise



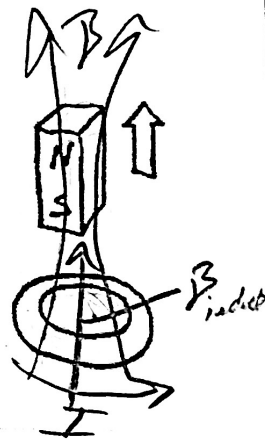
19. Through which wire is current flowing leftward?
 A. Wire A B. Wire B



20. Magnetic Flux through a coil is:
 a. The direction of a magnetic field near the coil
 b. The change in a magnetic field near the coil
 c. The number of turns in a solenoid that is moving near a magnet
 d. The number of magnetic field lines passing through the coil
 e. The strength of a permanent magnet that is used in a generator or motor



- 21-24. This drawing shows a "coil" (metal ring) and a permanent magnet. The drawing is a perspective drawing; the thicker section of the ring is closer to the viewer. The arrow shows movement of the permanent magnet.



21. What is the direction of the permanent magnet's field?
 A. up B. Down C. Left D. right
22. What is happening to the absolute magnitude of the magnetic flux through the coil?
 a. Increasing b. Decreasing c. No change
23. What is the direction of the magnetic field that is created in the coil?
 A. up B. Down C. Left D. right
24. What is the direction of the induced current along the near side of the coil?
 A. up B. Down C. Left D. right

- 25-28. This drawing shows a "coil" (metal ring) and a permanent magnet. The drawing is a perspective drawing; the thicker section of the ring is closer to the viewer. The arrow shows movement.

25. What is the direction of the permanent magnet's field?
 A. up B. Down C. Left D. right
26. What is happening to the absolute magnitude of the magnetic flux through the coil?
 a. Increasing b. Decreasing c. No change
27. What is the direction of the magnetic field that is created in the coil?
 A. up B. Down C. Left D. right
28. What is the direction of the induced current along the near side of the coil?
 A. up B. Down C. Left D. right

