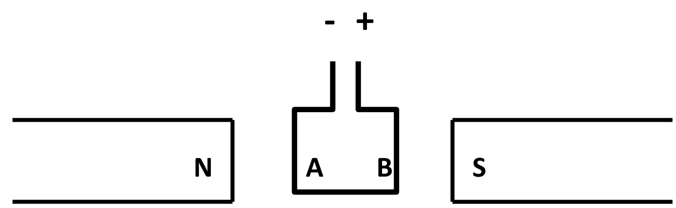
UCONN Physics 1202Q
Unit 14 – Magnets and Electromagnetism Copy: _____________
PreTest

Directions: Use the formulas from the formula sheet provided to help answer questions on the test.
DO NOT WRITE ON THIS TEST

1. Electrons travel in a wire in the Direction shown in the diagram. The force on the wire is:

   a. Up c. down
   b. Toward the N-pole d. 0 Newtons

2. A loop of wire between the poles of a magnet carries current in the direction shown. The resulting force will cause:

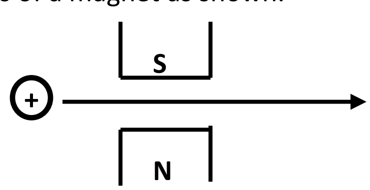


   a. Side "A" to come up out of the plane of the paper and side "B" to go below the plane of the paper.
   b. Side "A" to go into the paper and side "B" to come up out of paper.
   c. Side "A: to move to the left and Side "B" to the right, widening the loop of wire.
   d. Side "A" to move to the right and side "B" to the left, narrowing the loop of wire.

3. A current-carrying wire in a magnetic field experiences a force of 0.5 N. If the current is doubled and the strength of the magnetic field is also doubled, the new force is:
   a. 0.25 N b. 1.0 N c. 2.0 N d. 4.0 N

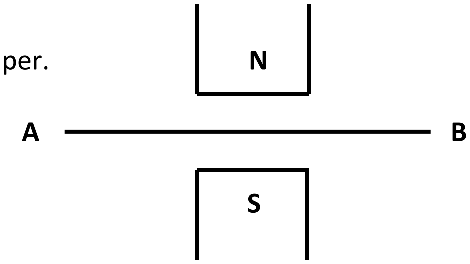
4. The Tesla measure:
   a. Magnetic flux density
   b. Inductive reactance
   c. Magnetic flux
   d. Self-inductance

5. A positive charge moves between the poles of a magnet as shown. The force on the charged object is:
   a. toward the N-pole
   b. Toward the S-pole
   c. Out of the paper
   d. Down into the paper



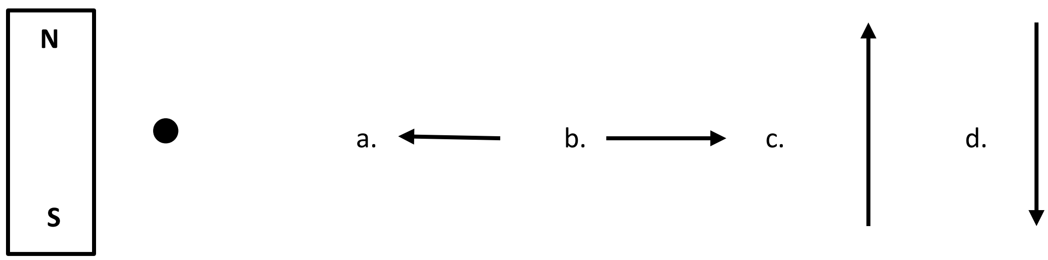
6. If the velocity of the charge in question #5 is tripled, the force on the charge:
   a. Triples b. Is one third as much c. Increases 9 times d. Is unchanged

7. The wire shown to the right in the diagram is Pushed rapidly down into the plane of the paper. Emf generated in the wire is:

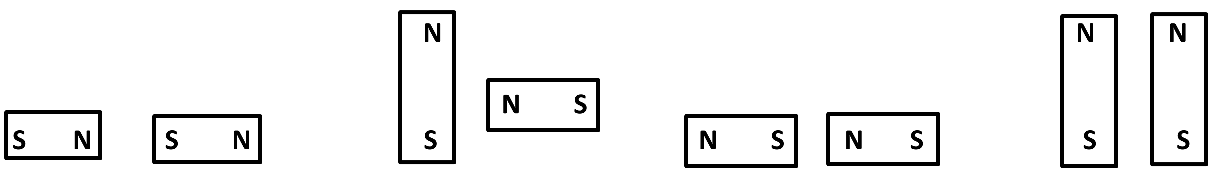


   a. With its positive end at “A”
   b. With its positive end at “B”
   c. such as to force the wire toward the S-pole
   d. Zero Newtons

8. The direction of the magnetic field at the point marked (dot) is best shown by which arrow?



9. In which of the arrangements shown below is there repulsion between the magnets?

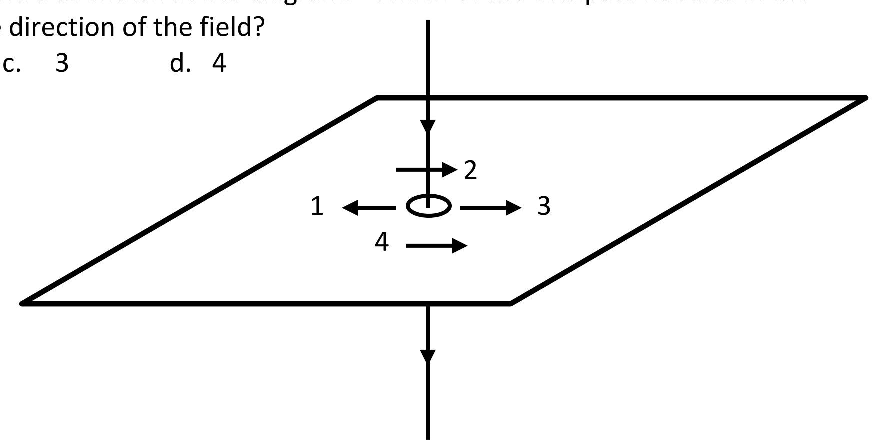


a. b. c. d.

10. Inside a steel magnet the magnetic field:
   a. Is directed from North to South
   b. Is directed from South to North
   c. I directed both ways
   d. Dos not exist

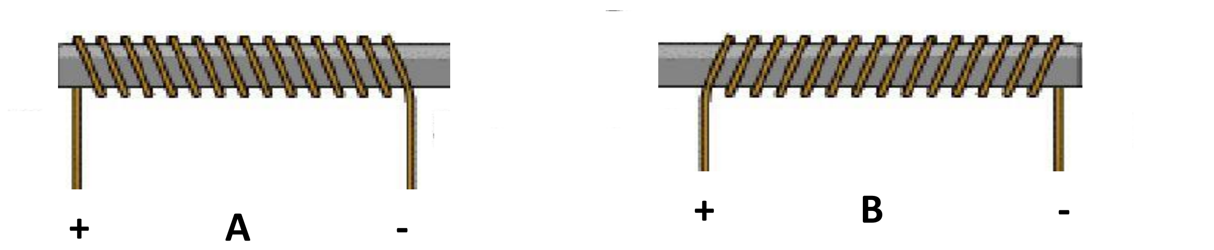
11. Iron has magnetic properties because:
   a. Its domains are lined up
   b. Electrons revolving around the nuclei create magnetic fields
   c. Its spinning electrons create uncanceled magnetic fields

12. Electrons flow in a vertical wire as shown in the diagram. Which of the compass needles in the diagram correctly show the direction of the field?
   a. 1 b. 2 c. 3 d. 4



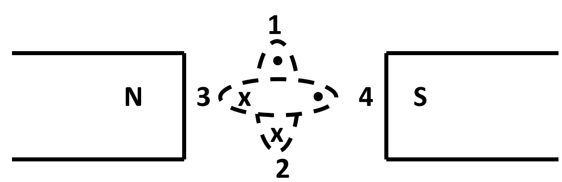
13. Electrons travel horizontally away from you. The magnetic field from your point of view corresponds to:
    a. Counterclockwise circles
    b. Clockwise circles
    c. Lines parallel to the motion of the positive charges, directed toward you
    d. Lines parallel to the motion of the positive charges, directed away from you

14. The drawings below show two electromagnets. Determine for each magnet the direction of the field inside the coil. The field directions are:



    a. Toward the right for "A": toward the left for "B"
    b. Toward the right for "B": toward the left for "A"
    c. Toward the right for both
    d. Toward the left for both

15. Between the magnets shown at the right, current flows through the wire loop, at what point is the current at its maximum?



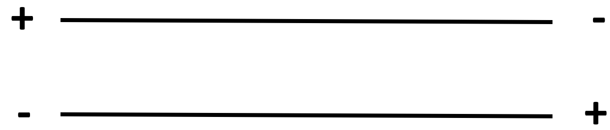
a. Both 2 & 4   b. both 1 & 3   c. both 1 & 4   d. both 3 & 4   e. both 1 & 2

16. Two parallel wires repel each other if there is:
    a. Current in both wires, in the same direction
    b. Direct current in one wire and alternating current in the other
    c. Current in one wire and not in the other
    d. Current in both wires, in opposite directions

17. If a bar magnet is suspended by a string within the earth's magnetic field:
    a. Nothing happens
    b. The S-pole of the magnet will point towards Earth's South pole
    c. The S-pole of the magnet will point towards Earth's North pole
    d. The N-pole of the magnet will point towards Earth's South pole

18. A conductor is moving perpendicularly to a uniform magnetic field. Decreasing the speed of the conductor will cause the potential difference induced across the ends of the conductor to:
    a. Decrease   b. Increase   c. Remain the same

19. In the diagram to the right the wires:
   a. Attract   b. Repel



20. In the diagram to the right the wires:
   a. Attract   b. Repel

21. In the below diagram, conventional current is passed above the given compass. When the current is turned on, how does the compass deflect?

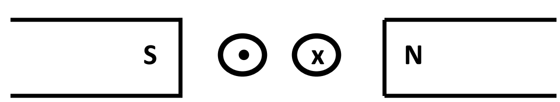
a. ↓   b. ↑   c. ←   d. →

22. If the current is reversed in the previous problem, what is the new orientation of the compass, in other words, which way will the needle deflect?

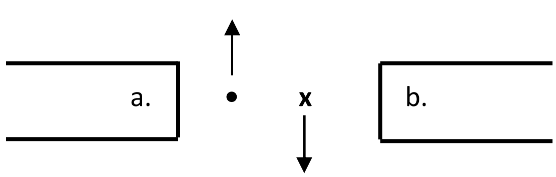
a. ↓   b. ↑   c. ←   d. →

23. In the diagram to the right the loop of wire is turning:

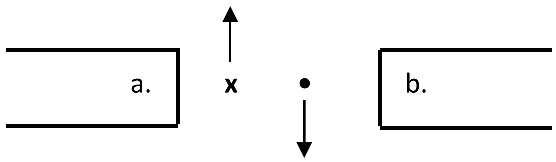
a. Clockwise   b. Counterclockwise



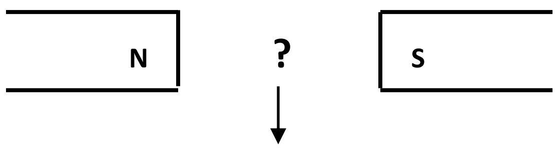
24. In the diagram below, the North-pole of the bar magnet is:



25. In the diagram below, the North-pole of the bar magnet is:

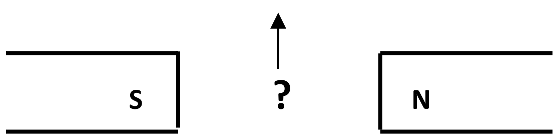


26. In the diagram below, the current that is flowing at the "**?**" is:



a. X **b. •**

27. In the diagram below, the current that is flowing at the "**?**" is:



a. X **b. •**

28. A proton is forced into moving at 5.0×10^4 m/s horizontally enters a region where a magnetic field of 0.12 T is present, directed vertically downward. What force acts on this proton?

   a. 1×10^{-23} N b. 9.6×10^{-16} N c. 1.92×10^{-20} d. 6000 N

29. A particle carrying a charge of +1 travels in a circular path in a uniform magnetic field. If instead the particle carried a charge of +2, the radius of the circular path would have been, all other variable remain constant:
   a. Twice the original radius
   b. Four times the original radius
   c. One-half the original radius
   d. One-fourth the original radius

30. A charged particle moves and experiences no Lorentz force. From this we can conclude that:
   a. No magnetic field exists in that region of space
   b. The particle is moving parallel to the magnetic field
   c. The particle is moving at right angles to a magnetic field
   d. Either no magnetic field exists or the particle is moving parallel to the field

31. A 20 cm long wire is wound round a solenoid with 5,000 turns of wire. What magnetic field is produced at the center the solenoid when a current of 10 amps' flow?
   a. 1.6 T b. 0.84 T c. 0.67 T d. 0.31 T

32. Doubling the number of loops of wire in a coil produces what kind of change in the induced emf assuming all other factors remain constant?
    a. The induced emf quadruples
    b. The induced emf triples
    c. The induced emf doubles
    d. There is no change in the induced emf when the number of loops changes

33. The flux through a single loop coil changes from 4×10^{-5} Wb to 5×10^{-5} Wb in 0.1 seconds. What emf is induced in this coil if its cross-sectional area is 0.8 m^2 ?
    a. 5×10^{-4} V b. 4×10^{-4} V c. 1×10^{-4} V d. 8×10^{-5} V

34. A coil lies flat on a table top in a region where the magnetic field vector points straight up. The magnetic field vanishes suddenly. When viewed from above, what is the sense of the induced conventional current in this coil as the field fades?
    a. The induced current flows counterclockwise
    b. The induced current flows clockwise
    c. There is no induced current in this coil
    d. The current flows clockwise initially and then it flows counterclockwise before stopping

35. A circular loop of wire is rotated at constant angular speed about an axis whose direction can be varied. In a region where a uniform magnetic field points straight down, what must be the orientation of the loop’s axis of rotation if the induced emf is to be zero?
    a. Any horizontal orientation will do
    b. It must make an angle of 45 degrees to the vertical
    c. It must be vertical
    d. None of the above

CHAPTER / UNIT # _____ ANSWER SHEET NAME: __________________
COPY # _______ PERIOD:___________
FORM ________ / DATE: __________

DIRECTIONS: **Use the back side for any Bonus problems and be sure to identify the bonus area. The "Work Area" is to be used like scrap paper. If you need additional paper, raise your hand and I will provide you additional paper. Any extra scrap paper needs to be stapled to this answer sheet. GOOD LUCK!!**

_A___ 1.	__A__26.
_B___ 2.	__A__27.
_C___ 3.	__B__28.
_A___ 4.	__C__29.
_C___ 5.	__D__30.
_A___ 6.	__D__31.
_A___ 7.	__C__32.
_D___ 8.	__C__33.
_D___ 9.	__A__34.
_B___10.	__A__35.
_C___11.	_____36.
_D___12.	_____37.
_A___13.	_____38.
_A___14.	_____39.
_D___15.	_____40.
_D___16.	_____41.
_B___17.	_____42.
_A___18.	_____43.
_B___19.	_____44.
_A___20.	_____45.
_B___21.	_____46.
_A___22.	_____47.
_B___23.	_____48.
_A___24.	_____49.
_B___25	_____50.

WORK AREA

Questions 31-35

These explanations are the best I can do on paper. For further help, see me before school for additional explanation.

31. $B = \mu_o n I = \mu_o \frac{N}{L} I$ Updated formula's to be put onto the formula sheet.

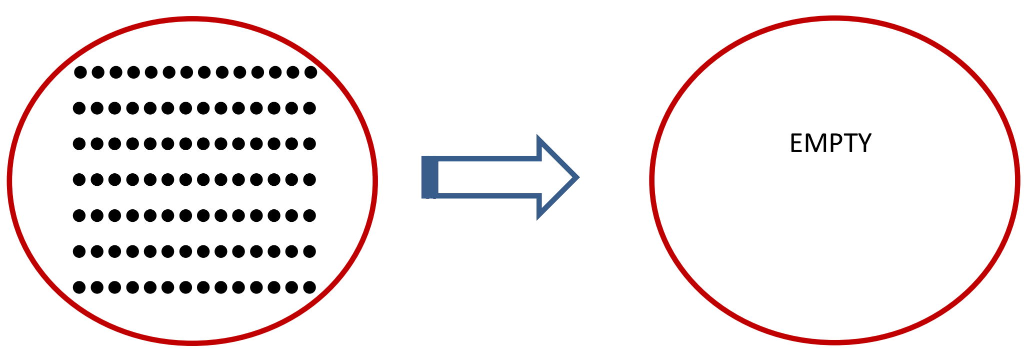
* μ_o is on page 5 of the formula sheet
N is the number of turns or loops
L is the length of wire
n is the ratio of N/L
I is the current

32. $\varepsilon = -N \frac{\Delta \phi}{\Delta t} = -N \frac{\beta \Delta A}{\Delta t}$

Use the above formula to solve this problem. only compare loops (N) to emf (ε)

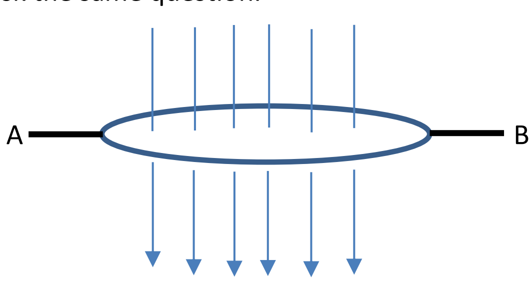
33. Use the above formula in #32 to solve this problem. Hint, cross sectional area is part of the flux (ϕ)

34.



Use the first right hand rule to by placing your thumb first in a clockwise direction around the empty wire and wrap your fingers around the wire. Remember your fingers indicate the direction of the magnetic field around the wire, ask yourself, do your fingers point into the paper inside the circle or come out of the center of the circle. Then repeat with your thumb in the counterclockwise direction and ask the same question.

35.



This wire spins about axis AB. The orientation of loop is horizontal (as pictured) or any other angle