

ADVANCED PHYSICS TERM 2 FINAL EXAM STUDY GUIDE PART 1

$$|F| = qvB\sin(\theta)$$

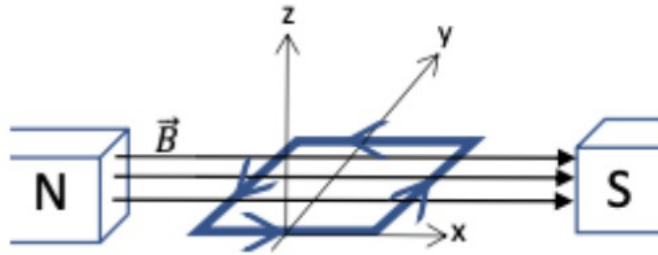
$$|F| = BIL\sin(\theta)$$

$$B = \mu_0 I / 2\pi r$$

$$F = mv^2/r$$

All currents are conventional.

1. Outside of a bar magnet, magnetic field lines point
 - a. from the north pole to the south pole
 - b. from the south pole to the north pole
 - c. from the east pole to the west pole
 - d. from the west pole to the east pole
2. Like magnetic poles(two north poles for example) will
 - a. attract each other
 - b. repel each other
 - c. fall in love
 - d. hate each other, then fall in love at the end of the movie
3. Magnetic field lines always
 - a. diverge
 - b. converge
 - c. are parallel to each other
 - d. form closed loops
4. A uniform B field points in the + y direction (up). A positively charged particle has a velocity in the + x direction (right). What is the direction of the magnetic force on the particle?
 - a. +z (out)
 - b. -z (in)
 - c. +y (up)
 - d. -y (down)
5. A positively charged particle is moving in the + y direction and it acted on by a magnetic force directed in the + z direction. What is the direction of the B field?
 - a. -z
 - b. +z
 - c. +x
 - d. -x



Questions 6 – 10 refer to the figure shown above. The figure shows a loop of wire in the $x - y$ plane carrying a current in a direction shown by the arrows, is located in a uniform B field pointing from left to right.

6. What is the direction of the magnetic force on left section of the wire?
 - a. up
 - b. down
 - c. left
 - d. right
 - e. no force acts on the section of wire

7. What is the direction of the magnetic force on front section of the wire?
 - a. up
 - b. down
 - c. left
 - d. right
 - e. no force acts on this section of wire

8. What is the direction of the magnetic force on the right section of the wire?
 - a. up
 - b. down
 - c. left
 - d. right
 - e. no force acts on this section of wire

9. What is the direction of the magnetic force on the rear section of the wire?
 - a. up
 - b. down
 - c. left
 - d. no force acts on this section of wire

10. If the loop of wire is free to rotate about the y axis the loop will
 - a. remain motionless
 - b. begin to rotate clockwise
 - c. begin to rotate counter clockwise

11. Charged particles moving perpendicular to a uniform B field will move along a _____ path.
- straight
 - parabolic
 - hyperbolic
 - circular
12. A long straight wire carries a current from left to right ----->.
What is the direction of the B field created by this current at a position above the wire?
- up
 - down
 - left
 - right
 - out of the page
 - into the page
13. A long straight wire carries a current directly towards you.
What is the direction of the B field created by this current at a position above the wire?
- up
 - down
 - left
 - right
 - out of the page
 - into the page
14. A loop of wire laying on a table carries a current flowing clockwise.
What is the direction of the B field created by this current at the center of the loop wire?
- up
 - down
 - left
 - right

Problems 15 – 20 are Free Response Questions

15. A particle with a charge of $+1\mu\text{C}$ moving along the $+x$ axis with a velocity of 100m/s in a region where a B field with magnitude of 1 T directed in the $+z$ direction. What is the magnitude and direction of the magnetic force on the particle?

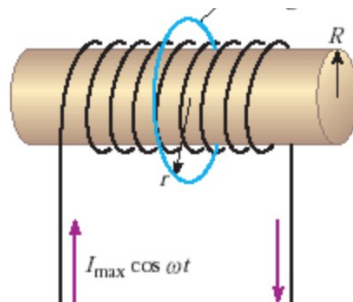
$1 \times 10^{-4}\text{T}$, down

16. A long straight wire carries a 1 A current along the +x axis. What is the magnitude and direction of the B field created by this current at the location $x = 0\text{m}$, $y = 1\text{ m}$?

$2 \times 10^{-7}\text{ T}$, out of the page

17. Two parallel wires 2 m apart carry a current of 100 A in the same direction. What is the magnitude of the net magnetic field directly between the wires?

0 T



18. A solenoid carries a current as shown above. What is the direction of the B field created inside the solenoid ?

- a. left
- b. right
- c. up
- d. down