PRETEST QUESTIONS
FOR THE MAGNETISM CHAPTER

1. A charged particle q, traveling through a magnetic field, has the force **F** acting upon it. Another particle with charge equal to -2q will have the same force acting upon it if:
a. it moves at half the velocity in the opposite direction.
b. it moves at twice the velocity in the opposite direction.
c. it moves at half the velocity in the same direction.
d. it moves at twice the velocity in the same direction.

2. A particle of charge q travels with velocity **v** in the same direction as the magnetic field, **B**. What is the force exerted on the charge?
a. qvB, in the direction of the magnetic field
b. qvB, in the direction opposite that of the magnetic field
c. qvB, in the direction perpendicular to the magnetic field and the velocity vector
d. zero

3. A particle of positive charge q travels with velocity v towards the top of the page. The magnetic field present, B, points rightward. The force:
a. points leftward
b. points into the page
c. points toward the bottom of the page
d. points out of the page

4. Two parallel wires carry currents in the same direction and exert a force on each of magnitude F for each meter of length. One of the currents is now reversed in direction and doubled in magnitude. What are the resulting magnitude for the force per meter of length and its direction relative to the wires.
a. 2F, attraction
b. 2F, repulsion
c. 4F, attraction
d. 4F, repulsion

5 OMIT

6. OMIT: Which of the following increases the magnetic moment of a rectangular coil the most?
a. doubling the coils current and its number of coils
b. doubling the coil's area and doubling the magnetic field in which the coil is place

c. doubling the magnetic field in which the coil is placed and doubling the angle between the magnetic field and the plane of the loop
d. All of these choices increase the magnetic moment by a factor of 4, thus they are all the "most"

7. The radius of the path of a charged particle moving perpendicular to a uniform magnetic field is given by $r = \dfrac{mv}{Bq}$. What is the time, T, it takes for the particle to complete one loop around its path? (Note that the time divided into the distance traveled equals the magnitude of the constant velocity. You will need this for several of the problems that follow.)

a. $\dfrac{Bq}{2\pi m}$

b. $\dfrac{2\pi m}{Bq}$

c. qBr
d. additional information must be given

8. OMIT: A circular current loop with radius r has a magnetic dipole moment . To gain the greatest increase in its magnitude, you could
a. double the radius and maintain the current.
b. double the radius and halve the current.
c. halve the radius and double the current.
d. double the current and maintain the radius.

9. A charged particle is moving perpendicular to a uniform magnetic field. The radius of its path can be decreased most by:
a. decrease the magnitude of the magnetic field
b. increase its velocity
c. decreasing its velocity and increasing the magnitude of the magnetic field
d. increasing its velocity and decreasing the magnitude of the magnetic field

10. A charged particle is moving perpendicular to a uniform magnetic field, the radius of its motion given by $r = \dfrac{mv}{Bq}$. The speed of the particle is tripled. The particle's time to complete one loop:
a. is divided by three
b. triples
c. stays the same
d. changes in ways that cannot be determined with the information given.

11. A charged particle moving perpendicular to a uniform magnetic field will follow a circular path with radius $r = \dfrac{mv}{Bq}$. If the magnetic field is doubled, what happens to the time that it takes for the particle to complete one loop around its path?
a. doubles
b. quadruples
c. halves
d. stays the same

12. In a mass spectrometer where ions are fired at a given speed perpendicular to the magnetic field, what would be the ratio r_{20}/r_{22} of the radii of the paths for singly-ionized neon atoms of masses 20 u and 22 u?
a. 100/121
b. 10/11
c. 11/10
d. 121/100

13. The magnetic field of a long, straight wire has a value B at a distance of r when the current is I. At a distance of 3.00 r, what current is necessary to produce a field having the same strength B at this position?
a. $1.73i_o$
b. $3.00i_o$
c. $9.00i_o$
d. more information needed

14. Solenoid #1 has 100 turns and is 10.0 cm long. Solenoid #2 has 200 turns and is 20.0 cm long. If a current of 0.50 A is carried by #1, what current must #2 carry so that it would produce a magnetic field at its center equal to that in #1?
a. .25 A
b. .50 A
c. 1.0 A
d. 4.0 A

15. Suppose a long, straight wire carries a current upwards. A short distance directly east of the wire, a negatively charge particle is moving upwards parallel to the wire. In what direction is the magnetic force on the particle?
a. the force is upward
b. the force is eastward
c. the force is westward
d. either there is no force or its direction is not given in these choices.

16. A wire carrying current I causes a magnetic field a distance a from the conductor. If the current is doubled to equal $2I$, then the new magnetic field at the same distance, in terms of I and a, will be
a. $B = \dfrac{\mu_o i}{\pi a}$

b. $B = \dfrac{\mu_o i}{a}$

c. $B = \dfrac{\mu_o i}{2\pi a}$

d. $B = \dfrac{\mu_o i}{2a}$

17. OMIT: A loop carrying current I has radius a. If the radius is halved, then the new magnetic field at the center of the loop, in terms of I and a, will be:

a. $B = \dfrac{\mu_o i}{\pi a}$

b. $B = \dfrac{\mu_o i}{a}$

c. $B = \dfrac{\mu_o i}{2\pi a}$

d. $B = \dfrac{\mu_o i}{2a}$

18. Two parallel current carrying wires exerted equal but opposite forces on each other. The current in the second wire is doubled. How do their forces relate now?
a. $F_1 = 2F_2$
b. $2F_1 = -F_2$
c. $F_1 = -F_2$
d. $F_1 = F_2$

19. A solenoid is stretched uniformly to a greater length. If the pre-stretch magnetic field was B, and the length increased 50%, what is the new value for the internal magnetic field in terms of B assuming the current does not change?
a. B/2
b. B
c. 3B/2
d. 2B/3

Solu: a, d, b, b, omit, omit, b, omit, c, c, c, b, b, b, b, a, omit, c, d