Physics 12: Introduction to Electromagnetism:

1. A very strong magnet is held next to a stationary positively charged sphere. Which of the following describes how the magnet affects the sphere?

A. It (the magnet) will attract it (the sphere).

B. It will repel it.

C. It depends on which pole of the magnet is close to the sphere.

D. It will have no magnetic affect on the sphere.

E. It (the magnet) makes it (the sphere) feel very slightly ashamed although it (the sphere) has no idea why.

2. The pointed end of a compass is normally, in a compass that is working properly, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pole of the compass needle. The Earth’s geographic \_\_\_\_\_\_\_\_\_\_\_\_ pole, where Santa lives, is a magnetic \_\_\_\_\_\_\_\_\_\_\_\_\_\_ pole.

3. A proton is fired at 2.2x106m/s, upwards, into a 0.090T magnetic field pointing to the left. The force on the proton is:

4. A proton is fired at 2.2x106m/s, to the right, into a 0.090T magnetic field pointing into the page. The acceleration of the proton is:

5. An electron is fired at 2.2x106m/s, to the left, into a 0.090T magnetic field pointing into the page. The force on the electron is:

6. An electron is fired at 2.2x106m/s, into the page, into a 0.090T magnetic field pointing down. The acceleration of the electron is:

7. A magnet is brought toward a CRT as shown below. Which shows the position of the light on the CRT screen with the magnet present?

8. An electron is fired into a magnetic field pointing out of the page. The electron is travelling in the plane of the page. Which of the following is true?

A. The electron feels no force.

B. The path of the electron will be parabolic.

C. The electron’s speed will increase.

D. The electron’s speed will decrease.

E. The electron will travel in a clockwise circular path.

F. The electron will travel in a counter cw circular path.

9. A particle with a charge of +4e and a mass of 2.6x10-15kg travels into the region between two parallel plates at 4.4x105m/s as shown. The plates are separated by 2.0mm. The region also contains a perpendicular magnetic field of 0.65T directed into the page. What must be the potential difference (V2-V1) between the plates if the particle continues in a straight line?

V1

V2

10. An electron has a velocity to the right. The electron enters a region containing a 0.090T out of the page.

a. Upon entering the field what direction is the force on the electron?

b. The electron’s path is a semi-circle with a radius of 4.5mm. Find the speed of the electron.

c. How much work is done on the electron by the magnetic field?

11. A wire is carrying 220mA of current. A section of the wire is placed into a uniform 0.050T magnetic field. Find the magnetic force on the section of wire.

0.24m

0.48m

12. Find the radius of the path of a proton travelling at 2.8x107m/s in a 0.080T perpendicular magnetic field.

13. Find the radius of the path of an electron travelling at 2.8x107m/s in a 0.080T perpendicular magnetic field.

14. A particle has a charge of 2e and is travelling at 1.0x106m/s. The particle enters a perpendicular 0.50T magnetic field and curves into a circular path with r= 12.5cm. What is the mass of the particle?

15. A wire passes through a magnetic field as shown. The wire carries 0.228A of current and the field measures 0.99T out of the page. What is the force (magnitude and direction) on the wire?

0.030m

0.030m

0.040m

16. A particle has a charge to mass ratio of 2.2x105C/kg. The particle follows a curved path of radius 10.0cm in a perpendicular 0.250T magnetic field. What is the speed of the particle?

17. A proton is fired at 2.2x106m/s, upwards, into a 0.090T magnetic field pointing downwards. The force on the proton is:

18. A proton is fired at 2.2x106m/s, to the right, into a 0.090T magnetic field pointing to the left. The acceleration of the proton is:

19. An electron is fired at 2.2x106m/s, to the left, into a 0.090T magnetic field pointing to the right. The force on the electron is:

20. An electron is fired at 2.2x106m/s, into the page, into a 0.090T magnetic field out of the page. The acceleration of the electron is:

21. A proton is fired at 2.2x106m/s, upwards, into a 0.090T magnetic field pointing 27oabove -x. The force on the proton is:

22. A proton is fired at 2.2x106m/s, to the right, into a 0.090T magnetic field pointing 27o above -x. The acceleration of the proton is:

23. An electron is fired at 2.2x106m/s, to the left, into a 0.090T magnetic field pointing 27o above -x. The force on the electron is:

24. An electron is fired at 2.2x106m/s, into the page, in a 0.090T magnetic field pointing 27o above -x. The acceleration of the electron is: