

Science 122
Review – Magnetism

Name - Key Date - _____

Print the letter of the best answer on the line provided.

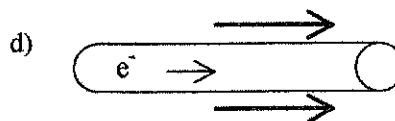
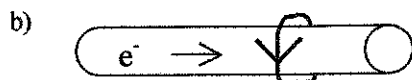
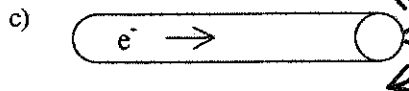
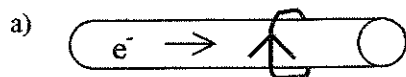
B 1. The strongest magnetic fields are found around:

- a) diamagnetic substances
- b) ferromagnetic substances
- c) paramagnetic substances
- d) isomagnetic substances

D 2. Magnetic lines of force have all but one of the following characteristics. The one they do not have is:

- a) they are most concentrated at the poles of the magnet
- b) they pass through copper
- c) they never cross one another
- d) they go from the south pole to the north pole of a magnet outside the magnet

A 3. Which diagram best represents the magnetic field around a current carrying conductor?



B 4. If the current through a solenoid increases, the magnetic field strength of the solenoid

- a) decreases
- b) increases
- c) remains the same

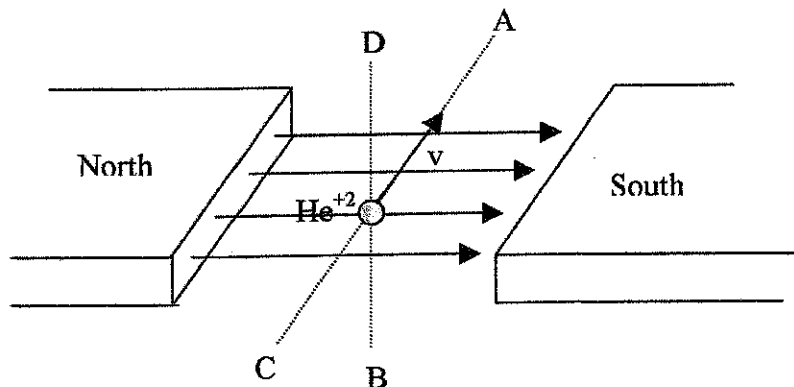
D 5. A magnetic force is experienced by an electron moving through a magnetic field. If the electron is replaced by a proton traveling at the same velocity, the magnitude of the magnetic force experienced by the proton would be

- a) twice as great
- b) half as great
- c) zero
- d) the same

B 6. A wire 0.50 m long carrying a current of 2.0 A is at right angles to a magnetic field of 0.40 T. The force acting on the wire is

- a) 0.10 N
- b) 0.40 N
- c) 1.6 N
- d) 10 N

Use the diagram below for questions 7 and 8.



B 7. The direction of the magnetic force acting on the helium ion with a charge of +2 elementary charges is toward point

- a) A
- b) B
- c) C
- d) D

C 8. If the strength of the magnetic field and the speed of the helium ion are both doubled, the force acting on He^{+2} will be

- a) halved
- b) doubled
- c) quadrupled
- d) the same

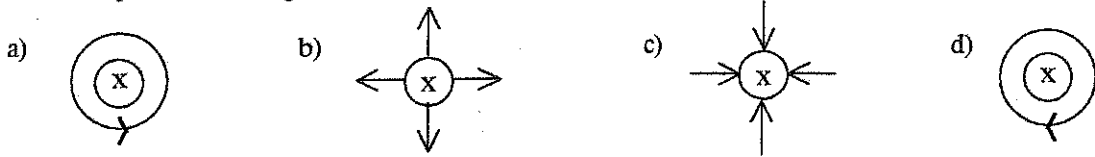
D 9. A particle with a charge of 2×10^{-6} C crosses a uniform magnetic field perpendicularly. The particle experiences a force of 1×10^{-3} N. If the particle has a speed of 1×10^6 m/s, the magnitude of the field strength is

- a) 2×10^3 T
- b) 2×10^2 T
- c) 5×10^{-1} T
- d) 5×10^{-4} T

C 10. A wire 0.5 m long is moving at right angles to the lines of force of a magnetic field of strength 0.4 T at such a speed that an EMF of 0.2 V is induced in it. The speed of the wire is

- a) 0.04 m/s
- b) 0.1 m/s
- c) 1 m/s
- d) 2 m/s

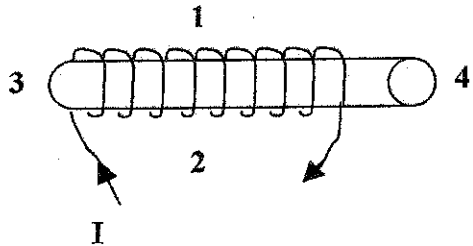
D 11. Each diagram below represents a cross-section of a long, straight, current-carrying wire. Which diagram best represents the magnetic field near the wire?



D 12. What information must be known to calculate the magnetic force on a charge as it moves perpendicularly through a magnetic field?

- a) the speed of the charge only
- b) the magnetic field intensity only
- c) the magnetic field intensity and the magnitude of the charge
- d) the speed, magnetic field intensity and magnitude of the charge

C 13. Which position indicates the location of the south pole of the electromagnet?



- a) 1
- b) 2
- c) 3
- d) 4

$$\frac{B}{2} = \frac{10 T}{2}$$

* A 14. A long straight wire carries a current I . If the magnetic field a distance d from the wire has a magnitude B , what is the magnitude of the magnetic field at a distance $2d$ from the wire?

- a) $B/2$
- b) $B/4$
- c) $2B$
- d) $4B$

$$B = \frac{\mu_0 I}{2\pi d} \quad B_{new} = \frac{\mu_0 I}{2\pi (2d)}$$

$$|C = As$$

B 15. Which combination of units can be used to express magnetic field?

- a) kgm^2/C
- b) $kg/(Cs)$
- c) kg/C^2
- d) Nm^2/C

$$I = \frac{q}{t}$$

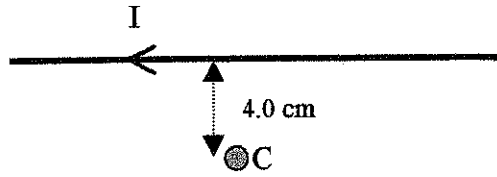
D 16. Which is true concerning the magnetic force on a charged particle in a magnetic field?

- a) It is a maximum if the particle is stationary.
- b) It is zero if the particle moves perpendicular to the field.
- c) It is a maximum if the particle moves parallel to the field.
- d) It depends on the component of the particle's velocity that is perpendicular to the field.

$$F = qvB \sin \theta$$

b 17. A long straight wire is carrying a current in the direction shown in the figure below. The point C is 4.0 cm from the wire. If the magnitude of the magnetic field at C is 2.5×10^{-5} T, what is the current in the wire?

- a) 5.0×10^2 A
- b) 5.0 A
- c) 2.0×10^1 A
- d) 0.20 A



b
r = 4.0 cm

c 18. An electron traveling horizontally enters a region where a uniform magnetic field is directed into the plane of the paper as shown. Which phrase most accurately describes the motion of the electron once it has entered the field?

- a) upward, parabolic
- b) upward, circular
- c) downward, circular
- d) downward, parabolic

