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Continuing Education Course #615
Electromagnetic Theory
Electric & Magnetic Theory & Application - Course 2

1. _____ fields result from _____ charges and produce _____ forces.
 - a. longitudinal / moving / electric
 - b. longitudinal / stationary / magnetic
 - c. transverse / moving / magnetic
 - d. transverse / stationary / electric

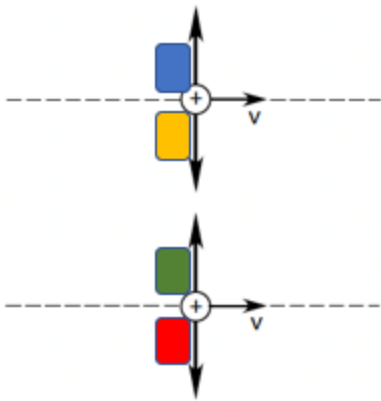
2. The right-hand rule uses conventional (positive) current flow. It states that pointing the _____ in the direction of the current flow and _____ the fingers inward gives the direction of the magnetic field.
 - a. hand / thumb
 - b. index finger / thumb
 - c. thumb / curling
 - d. thumb / hand

3. Which pole is consider a magnetic source?
 - a. north
 - b. south
 - c. neither
 - d. either

4. The magnetic equivalent to Coulomb's law is called what?
 - a. Biot-Savart Law
 - b. Einstein's Law
 - c. permeability ratio
 - d. permittivity ratio

5. What is the relationship of the permeability and permittivity of free space to the speed of light?
 - a. $c^2 = \frac{1}{\mu_0 \epsilon_0}$
 - b. $c^2 = \frac{\mu_0 \epsilon_0}{1}$
 - c. $c = \frac{1}{\mu_0 \epsilon_0}$
 - d. $c = \mu_0 \epsilon_0$

6. What colors represent the electric force on the moving particles?



- a. blue / red
- b. orange / green
- c. orange / red
- d. blue / green

7. What is the ratio of the magnetic force to the electric force if the drift velocity of electrons in a single wire is 0.02 cm/s?

- a. 4.45×10^{-29}
- b. 4.45×10^{-27}
- c. 4.45×10^{-25}
- d. 2.23×10^{-24}

8. What is most nearly the total permeability if the relative permeability of purified iron is 10,000?

- a. 0.012
- b. 0.013
- c. 0.15
- d. 12.266

9. What is the permeability of a material with the following properties?

$$B = 50 \mu\text{T [About 4 Lines per Square Inch]}$$

$$H = 50 \frac{\text{A}}{\text{m}}$$

- a. $1 \times 10^{-6} \text{ H/m}$
- b. $50 \times 10^{-6} \text{ H/m}$
- c. 1 H/m
- d. 50 H/m

10. What is the magnitude of the magnetic flux density given the following conditions?

Flux: 1.5 Wb

Area: 2 ft²

- a. 0.062
- b. 0.75
- c. 1.3
- d. 8.06

11. What type of material has a nonlinear susceptibility?

- a. diamagnetic
- b. ferromagnetic
- c. paramagnetic
- d. none, it is constant

12. A long wire with a radius of 0.001 m carries 20 A of current. What is the magnetic field strength 0.01 m from the surface of the wire?

- a. 3.64×10^{-8} T
- b. 5.45×10^{-7} T
- c. 3.64×10^{-7} T
- d. 3.64×10^{-4} T

13. The divergence of a magnetic field through a closed surface is _____.

- a. 0
- b. 1
- c. Q
- d. I

14. What is the amount of flux in a 10-turn solenoid carrying 20 with a self-inductance of 1 F?

- a. 2 Wb
- b. 10 Wb
- c. 20 Wb
- d. 200 Wb

15. What energy is in an inductor of 0.5 F carrying 15 A?

- a. 0.5 J
- b. 56.2 J
- c. 112.5 J
- d. 225 J

16. What is the total inductance of 2 inductors of 0.25 H in parallel?

- a. 0.125 H
- b. 0.250 H
- c. 2.00 H
- d. 4.00 H

17. A magnetic force can change the _____ of a charge.

- a. direction
- b. kinetic energy
- c. potential energy
- d. speed

18. Consider the following equation.

$$\mathbf{F} = Q\mathbf{v} \times \mathbf{B}$$

The velocity applies to what component in a motor / generator?

- a. conductor / current
- b. conductor / electrons
- c. current / conductor
- d. positive charges / conductor

19. What is the magnetomotive force of 50 turns of wire carrying 15 A?

- a. 750 A-turns
- b. 50 A
- c. 15 A-turns
- d. 15 A

20. EMI issues may be separated into two basic categories. What are these categories?

- a. conducted / radiated
- b. conducted susceptibility / conducted emissions
- c. design / environment
- d. noisy components / susceptible components

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