

Homework 6

(100 points)

Instructions: Submit in canvas a copy of your solution. Show all steps to receive full credit.

A. Multiple Choice Questions (5 points each):

Choose one answer from the following multiple-choice questions

1. Which of the following would be the least conductive(electrically)?

- a. Copper
- b. Salt water
- c. Glass
- d. Mercury

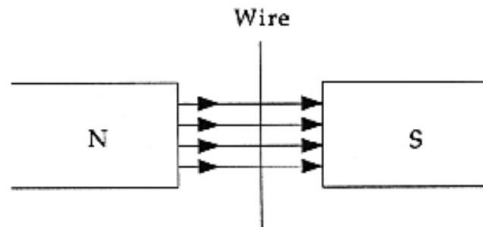
2. The electrical power dissipated by a resistance R is

- a. inversely proportional to I .
- b. directly proportional to I^2 .
- c. directly proportional to I .
- d. none of these.

3. A ferromagnetic material loses this property above the _____ temperature.

- a) domain
- b) Faraday
- c) Curie
- d) Coulomb

4. Consider a wire at rest with **no current** in a magnetic field as shown in the following figure. What will happen to the wire?



- a. A current will flow in the wire.
- b. The wire will be pushed perpendicular to the plane of the magnetic field.
- c. The wire will be pushed toward the north pole.
- d. Nothing will happen.

B. Question(10 points each)

Write down your answers the following questions (10 points each):

1. Write down and compare the law of charges and the law of poles. What is the difference between electric charges and magnetic poles.

2. Explain how a charged rubber comb attracts bits of paper and how a charged balloon sticks to a wall or ceiling.

C. Exercises(15 points each)

Solve the following exercises writing down the formula used in your solution.

1. How many electrons make up two Coulomb of charge?

Hint: use formula used in example 6.1 from the problems and review question.

2. A flashlight uses batteries that add up to 3.0 V and has a power output of 0.50 W.
(a)How much current is drawn from the batteries?

- (b)What is the effective resistance of the flashlight?

3. The heating element of an iron operates at 110V with a current of 10 A.
(a) What is the resistance of the iron?

(b) What is the power dissipated by the iron?

4. A step-up transformer has 10 loops on its primary coil and 50 loops on its secondary coil. If the primary coil is supplied with an alternating current at 120 V, what is the voltage in the secondary coil?