Name: _____ Practice Ph12 5-4

An electric motor is connected to a 9.0 V power supply. The data table below shows how the back emf of the motor, V_{back} , varies with the current through the armature, I , as the mechanical load changes.

Back emf $V_{back}(V)$	7.5	6.0	4.5	3.0	1.0	0
CurrentI(A)	1.0	2.0	3.0	4.0	5.0	6.0

1. Plot a graph of voltage versus current and determine the slope of this graph.
2. What property of the motor does the slope of this graph represent?
3. The lights in kitchen dim when the motor in the refrigerator starts. The reason is that,when the motor is starting ...
   A. there is a greater voltage drop in the wires of the kitchen circuit because of the greater current drop through the motor.
   B. The total resistance in the kitchen circuit is greater.
   C. the back EMF (reverse voltage) in the motor is higher.
   D. the motor draws current from the lights.
4. A student pushes an electric lawnmower through long grass so that the motor runs at one quarter the normal running speed. Why would the electric motor heat up?
   A. It can't draw enough current for the increased load.
   B. The motor has to work to hard.
   C. The electrical resistance is to high.
   D. The current is to high.
5. A motor has an armature resistance of 3.5 ohms and is connected to a 12.0 V source. At full speed the current through the armature is 0.18 A. What is the back emf at full speed?
   A. 12.0 V
   B. 0 V
   C. 0.63 V
   D. 11.4 V
6. A dc motor is connected to a 12.0 V power supply. When the armature is rotating, the current through it is 0.78 A and the back emf is 10.6 V. What is the resistance of the armature?
   A. 15 ohm
   B. 14 ohm
   C. 1.8 ohm
   D. 1.4 ohm

7. An electric motor rotates at various speeds and the current through the armature changes accordingly. Which pair of conditions occurs when the motor generates the greatest back emf?

	Speed	Current
A.	slowest	smallest
B.	fastest	largest
C.	fastest	smallest
D.	slowest	largest

8. A 120 V dc motor has an armature resistance of 5.0 ohm and draws 6.0 A when it is operating normally. What is the starting current of the motor and the back emf when it is operating?

	Starting Current	Back Emf When Operating
A.	24 A	90 V
B.	24 A	30 V
C.	6.0 A	90 V
D.	6.0 A	30 V

Use the following information to answer the next 2 question(s).

A transformer has 840 primary and 56 secondary windings. The primary coil is connected to a 110 V ac power supply which delivers a 0.30 A current to the transformer.

9. Find the secondary voltage (in volts).

10. Find the secondary current (in Amps).

11. An 85% efficient transformer is used to step up the voltage in a line from 12 V to 54 V. If there are 250 turns in the primary coil, how many turns of wire are there in the secondary coil?
    A. 1.13×10^3
    B. 2.13×10^2
    C. 2.94×10^2
    D. 1.32×10^3

12. A step-up transformer increases
    A. energy
    B. power
    C. both of the above
    D. none of the above

13. A transformer has 524 turns on the primary coil and 145 turns on the secondary. If the potential difference across the primary coil is 124 V ac, what emf is induced in the secondary?
    A. 448 V ac
    B. 124 V ac
    C. 34.3 V ac
    D. zero

14. In a step-down transformer, which of the following is greater in the secondary than in the primary?
    A. number of turns
    B. power
    C. current
    D. voltage