1. While out for a walk with his mother, Lance notices a large, cylindrical gray box high atop a telephone pole. His mother explains it is a transformer .The transformer takes 6000 V from the power company and outputs 240 V supplied to each of the houses on the street, with the use of a secondary coil containing 100 turns. A) How many turns are there in the primary coil? (*Ans: 2500 loops)* B) is this a step-up or step-down transformer?
2. A proton is launched into a uniform magnetic field of 3.5 T into the page. Inside the field, the proton experiences 5.2×10-11 N of force to the left. What must be the speed and direction of the proton as it travels in the field? (*Ans: 9.7 m/s, up*)
3. You are planning a trip to Singapore. Your travel agent gives you the proper transformer to step down the voltage so you can use your electric appliances there. Curious, you open the case and find that the primary coil has 46 turns and the secondary has 24 turns. Assuming the output voltage is 120 volts, what is the output voltage necessary for your appliances to work properly (This is the standard household voltage in Singapore) (*Ans: 230 V)*
4. In England, standard household voltage is 240 volts. If you brought your own hair dryer on a trip there, you would need a transformer to step down the voltage before you plug in the appliance. If the transformer steps down voltage from 240 to 120 volts, and the primary coil has 50 turns, how many turns does the secondary coil have? (*Ans: 25 turns)*
5. A businessman from Zimbabwe buys a transformer so that he can use his own electric appliances on a trip to the United States. The input coil has 60 turns while the output coil has 110 turns. Assuming the input voltage is 120 volts, what is the output voltage necessary for his appliances to work properly? (This is the standard household output voltage in Zimbabwe.) (*Ans: 220 V)*
6. In the giant CERN particle accelerator in Switzerland, protons are accelerated to speeds of 2.0 ! 108 m/s through a magnetic field of 3.5 T and then collided with a fixed target. What is the magnitude of the magnetic force experienced by the protons as they are accelerated around the giant ring? (*Ans: 1.1 x 10-10 N)*
7. While vacuuming the living room rug, Buster pulls the 4.0-m vacuum cleaner cord so that it is lying perpendicular to Earth’s magnetic field of 5.3 x 10-5 T. a) If the cord is carrying a current of 6.0 A, how large a magnetic force is created on the cord by Earth’s magnetic field? b) If Buster then pulls the cord so that it lies parallel to Earth’s magnetic field, how large is the magnetic force now experienced by the cord? (*Ans: a) 1.3 x 10-3N, b) zero)*
8. Patty is driving down the expressway on her way to the office in a town where the horizontal component of Earth’s magnetic field is 3.5 x 10-5 T to the north. The driver’s side window of Patty’s car has an area of 0.40 m2. a) What is the magnitude of the flux through the window if the car is moving west? (*Ans: 1.4 x 10-5 Wb)*
9. A proton having a speed of 5.0×106 m/s in a magnetic field feels a force of 8.0×10-14 N toward the west when it moves vertically upward. What is the strength of the magnetic field in this region? (*Ans: 0.10 T)*
10. How much current is flowing through a 6.3 m long wire if it experiences a force of 0.90 N when placed in a uniform 0.088 T field? (*Ans: 1.6 A)*
11. Emma is spinning her wedding ring, which has a radius of 0.01 m, perpendicular to Earth’s magnetic field of 3.0 x 10-5 T. Calculate the change in flux through the ring (Hint: area of a circle is $πr^{2}$) (*ans: 9.4 x 10-9 Wb)*
12. Kevin is pedaling his bike down the street perpendicular to the earth’s magnetic field of 5.5 x 10-5 T. What is the flux through the metal rim of the bicycle wheel if it has an area of 1.13 m2? (*Ans: 6.2 x 10-5 Wb)*

Draw picture and label with givens, equation, equations with givens, solution