

Grade 10 Chapter 3 Workbook Questions

St John Baptist De La Salle Catholic School, Addis Ababa

22/23 Academic Year

Questions

1. Define current and explain current in different ways. For example, state why although capacitors can be treated as open switches, current still runs in the circuit.
2. A conducting copper wire has a diameter of 2.228 mm. What magnitude current flows when the drift velocity is 1.00 mm/s?
3. Given that the density of Manganese is $3.7g/cm^3$ and that we assume that there are 3 mobile electrons per each atom, calculate the electron density of a conducting wire made of Manganese.
4. Power outages are common in Ethiopia and hence rechargeable batteries are common. One such example of battery is a "power bank" that we can use to charge our devices. Aaron's "power bank" boasts a $6000mAh$ capability. What physical quantity does mAh represent?
5. Why are two conducting paths from a voltage source to an electrical device needed to operate the device?
6. Why isn't a bird sitting on a high-voltage power line electrocuted? What happens when it steps its feet on both wires?
7. Discuss both the macroscopic and microscopic aspects of Ohm's Law.
8. What is the effective resistance of a car's starter motor when 200 A flows through it as the car battery applies 12.0 V to the motor?
9. Find the conductivity and resistivity of a material if it is 50.0 m long with a 0.050 mm diameter and has a resistance of 80Ω at $20^\circ C$?
10. What does ammeter measure? How should it be connected to the circuit? Why? What about a voltmeter?
11. If there are n identical resistors of resistance R in a network and 40% of them are connected in series while the other 60% are connected in parallel, find the effective resistance in terms of n & R .
12. Given a battery, an assortment of resistors, and a variety of voltage and current measuring devices, describe how you would determine the internal resistance of the battery.
13. The hot resistance of a flashlight bulb is 5Ω , and it is run by a 2.8-V alkaline cell having a internal resistance of 0.3Ω .
 - (i) What current flows through the bulb?
 - (ii) Calculate the power dissipated by the bulb.

- (iii) What is the efficiency of the bulb?
14. Show that for two resistors R_1 and R_2 , the effective resistance when they are combined is larger when the resistors are in series than when they are in parallel.