2018-2019 Term 2

PHYS1001 Essential Physics

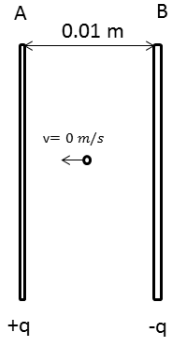
Assignment 7

Due date: 26th March, 2019 by 6:00 pm

(Please leave your homework in the box with the label "PHYS 1001" outside room 213 in Science Centre North Block)

Please answer **all** five questions

1. An electron, originally placed at the mid-point between the two charged planes, starts from rest. It is known that the electric field between the two plates is uniform and has a value of 0.002 N/C. Ignore the effect of gravitation in the calculation. Given that the mass of an electron is 9.11×10^{-31}kg.



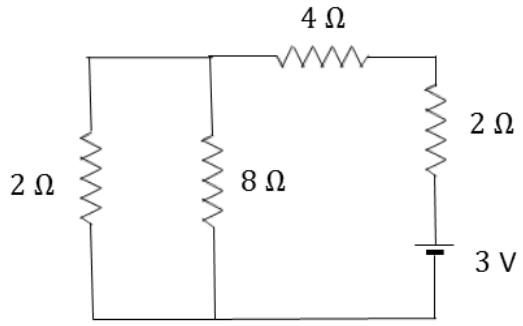
   (a) Calculate the electric force on the electron.
   (b) Calculate the time it takes the electron to reach plate A.

2. A student measures the resistance of an unknown resistor experimentally by collecting the potential difference V across the resistor and the current passing through the resistor.

V/volts	2	4	6	8	10	12
I/mA	16	32	49	63	80	96

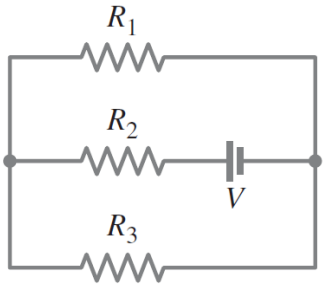
   (a) Plot a graph of *V* against *I*. Label your graph properly.
   (b) What is the meaning of the slope of the graph? Find the value of the slope.

3. (a) Calculate the current passing through each resistor.



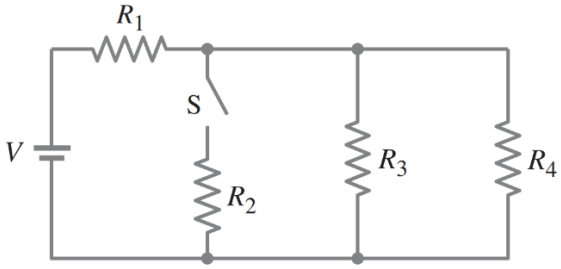
(b) Calculate the power consumed by each resistor.

4. In the circuit below, the resistance of resistors 1, 2 and 3 are 10 Ω, 5Ω and 10 Ω respectively. The EMF of the battery is 5V.



(a) Calculate the current passing through R_2.
(b) Calculate the voltage across R_1 and R_3

5. Consider the following circuit:



The resistance of each resistor is 10 Ω and $V = 100$ V.

(a) Before the switch is closed, calculate the current through each resistor.
(b) After the switch is closed, calculate the current through each resistor.