August 28, 2025

PH4207 Problem Set: I (Total Marks: 20)

Due on 2nd September 2025

1. (a) Consider the Wheatstone Bridge in figure 1. Using Kirchhoff's current law and voltage law, find the null condition in the galvanometer. [2]

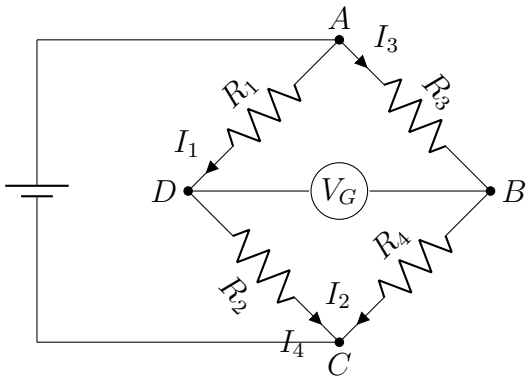

Figure 1: Wheatstone Bridge Circuit with Galvanometer

(b) If the Galvanometer V_G is replaced by a resistance R_5, find the current flowing through the nodes $D - B$ using KCL and KVL. [4]

2. Consider the following circuit given in figure 2.

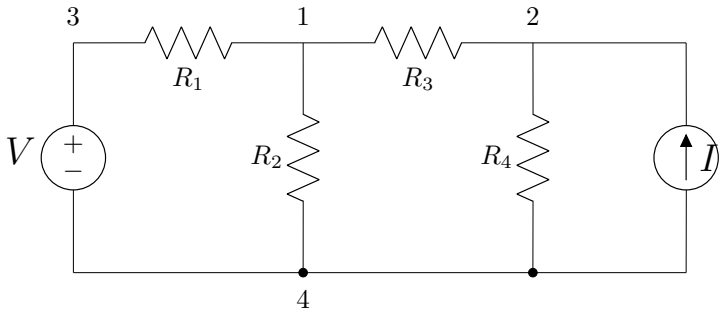

Figure 2: A Network of resistances with with two sources, V and I

(a) Using the node method, find the voltage across and the current through resistor R_3. What is the direction of the current? [3]

(b) Calculate the voltage and the current between nodes 1 and 3 using the superposition method. [3]

(c) Find the Thevenin equivalent circuit as seen from terminals 2 and 4. [4]

(d) Find the Norton equivalent circuit as seen from terminals 2 and 4. [4]