**Governor Stirling Senior High School**

**2019 Year 12 Physics**

**Task 7A: Experiment – Electromagnetism**

**Determining the field strength in a coil for an applied current.**

**Marks: /12**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Background:**

When a current flows through a coil (a solenoid) a uniform magnetic field parallel to the sides of the coil is produced. The strength of the field (B) depends upon the current (I) applied.

**Aim:**

To apply a current in a coil (solenoid) and calculate the field strength produced inside the coil.

**Equipment:**

Current balance kit

Two ammeters (0-5A)

Two 12 V DC power pack

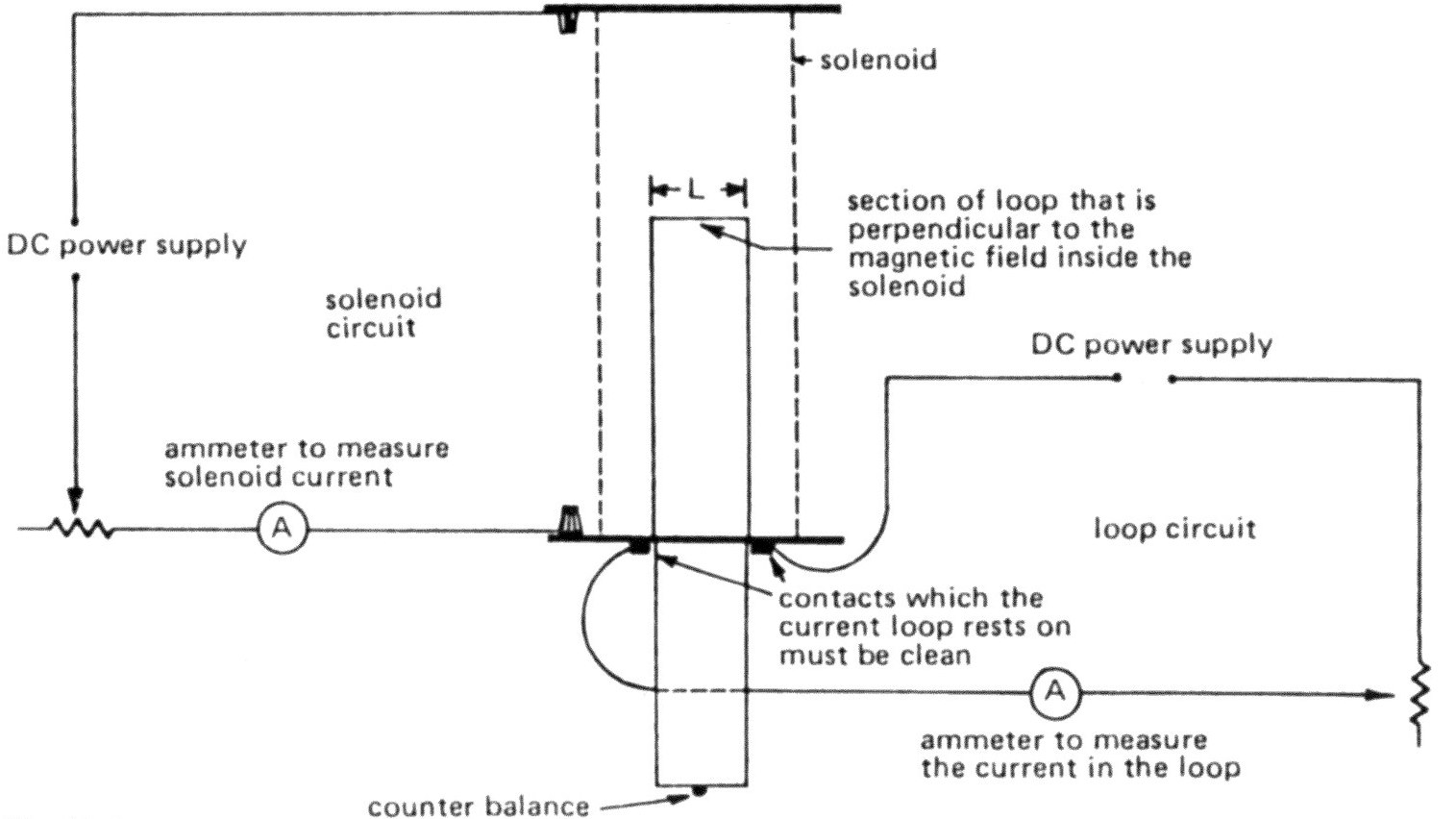
2 Rheostats

Connecting leads

Coil (solenoid)

**Procedure:**

1. Set up the equipment as shown below. DO NOT TURN ON THE POWER.
2. BALANCE THE LOOP so it is horizontal.
3. When you have completed the circuit you **raise your hand so that your teacher can check it.**



**/3**

**-1 mark for each error. Ensure correct polarity of connections to meters.**

**No loss of marks if equipment problem.**

**/4**

1. Place a piece of the nichrome wire on the end of the loop.

**/1**

**/4**

Mass of wire = **2/100 x 0.701 g = 0.01402g**

**= 1.402 x 10-5 kg**

1. Switch on the circuit. Adjust the current in the coil and in the loop so that the loop is again horizontal.

Record results here: Coil current = \_\_\_\_\_\_\_\_\_\_\_\_\_ Loop current = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**/2**

**/4**

**Raise your hand so that your teacher can check your readings**

1. Below is a diagram of the current balance setup:

COIL

LOOP

**F= mg**

**/1**

**/4**

**F= IlB**

Complete the formulae in the boxes.

1. Using the correct current value, calculate the field strength in the coil.

**/4**

**1 correct I**

**1 correct** l

**1 mass in kg**

**1 answer**

**/4**

mg = IlB **B =** **1.402 x 10-5 9.8**

**I x 0.024m**

**B = 5.798 x 10-3/I T**

**= Ans (3sf, 2 ok) T**

ANSWER: A current of \_\_\_\_\_\_A in the coil produces a field strength of \_\_\_\_\_\_\_\_\_\_

**/1**

**1 correct coil (solenoid) current quoted**

**/4**