EE3006* Experiment-3 Lab Report

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A 1 mA full-scale PMMC ammeter will be provided to you. You are required to perform the following experiments.

Question-1

(a) Measure the resistance Rm of the given PMMC meter using DMM.
Rm = 48.8 Ohms

(b) Design a (0-10) V DC voltmeter using the given PMMC. Calibrate the meter. Use comparison method of calibration with a $3\frac{1}{2}$ digit multi-meter

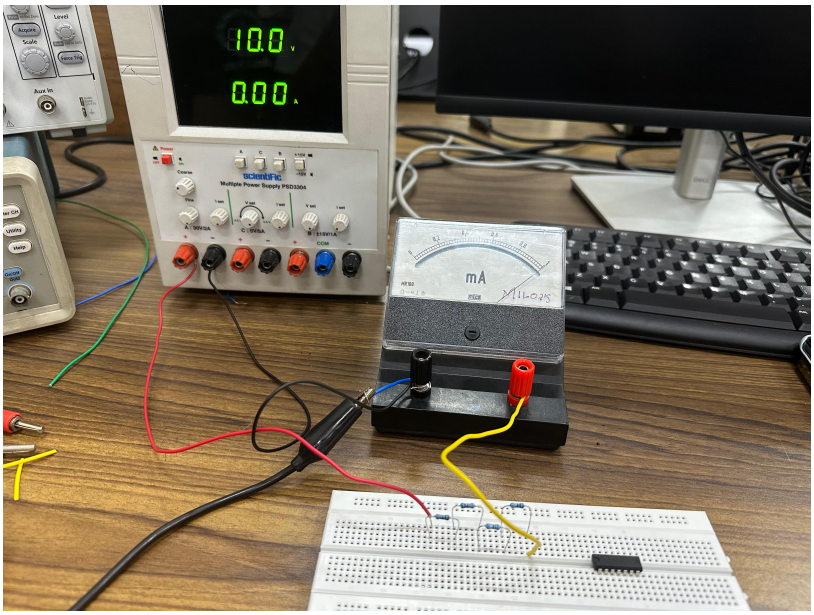

Figure 1: DC voltmeter setup

(c) What is the sensitivity of the voltmeter?
Sensitivity = V max/R total

Rtotal is the total resistance (PMMC internal resistance + series resistor).

Vmax is the full-scale voltage (10 V in this case)

Question-2

(a) Design a series type Ohm meter for a half scale reading, Rh = 10 k. Set the voltage E shown in Fig. 1 to 12 V. Check the meter reading by connecting 4 appropriate unknown resistors, Rx and verify their values using DMM.

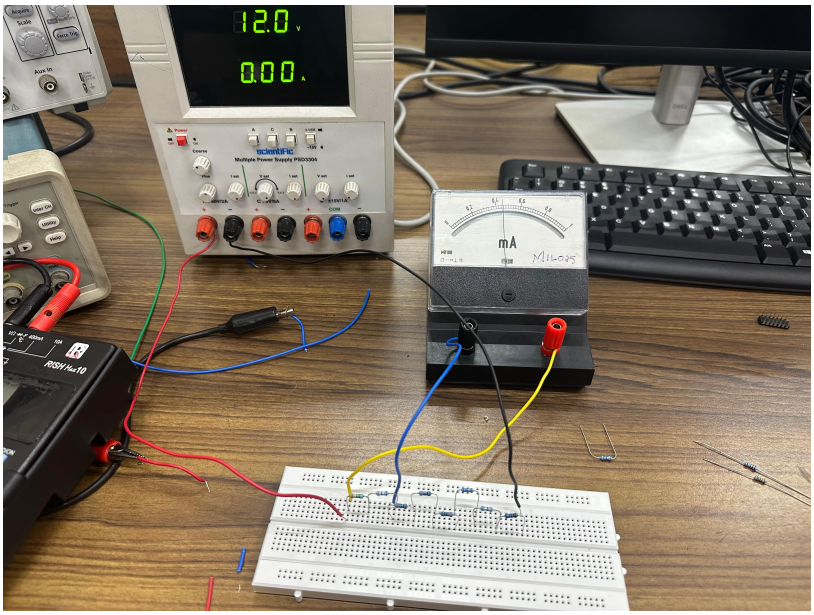

Figure 2: DC voltmeter setup

Taking Rm = 48.8 Ohms, we calculate R1, R2

Obtained R1=9959.3 ohm, R2= 244 ohm

We obtained values of current for five different values of Rx = 12 kohm, 7.5 kohm, 18 kohm, 1.5 kohm, respective values of current are 0.445 A, 0.58 A, 0.35 A, 0.88 A

(b) Repeat the same for E = 11 V and E = 13 V, after compensating appropriately using R2.
Same experiment was repeated for values of E = 11 V and E = 13 V and respective values were noted down.

Question-3

Design a (0 3) V AC voltmeter as shown in Fig. 2 and calibrate it. Use the function generator as the input source to generate a sinewave at 100 Hz. Note: 3 V represents RMS value.

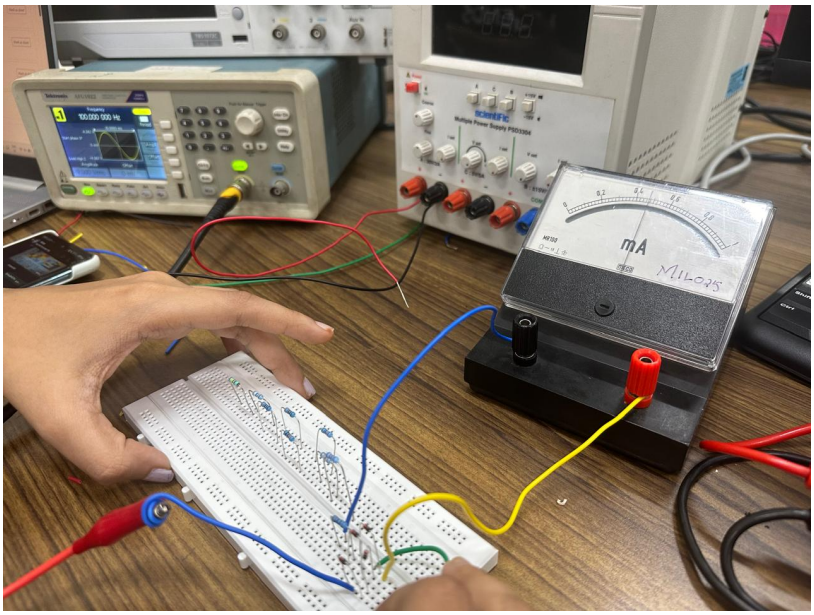

Figure 3: DC voltmeter setup

Question-4

(a) Build a (0 – 3) V AC voltmeter as shown in Fig. 3 based on the feedback concept. Calibrate the same against the DMM. Verify the operation and compare it with the meter given in Section. 4. Use the function generator for generating the sinusoidal input signal at 100 Hz. Note: 3 V represents RMS value. (b) What is the maximum allowed input voltage for the system? (Note : You may choose any appropriate value for RB.)

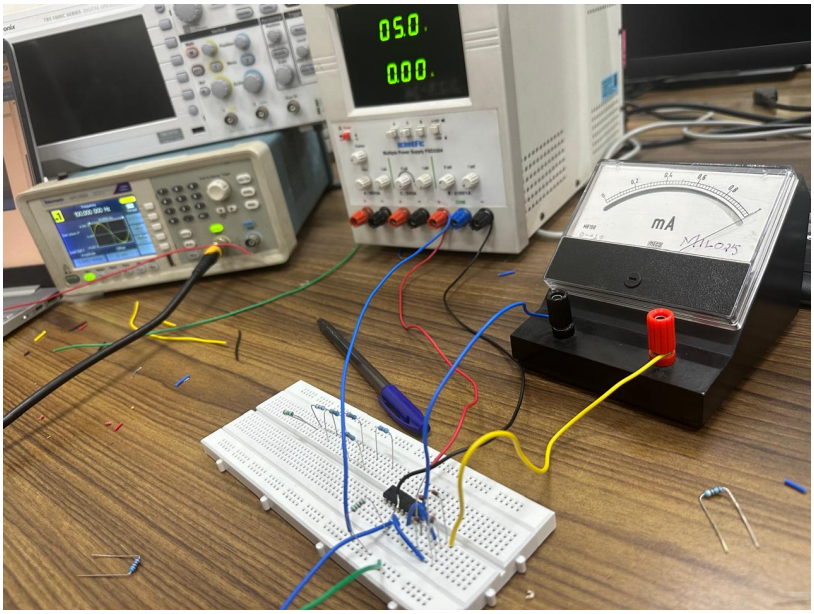

Figure 4: DC voltmeter setup

RB = 3 Kohm

maximum allowed input voltage for the system Vmax= 2.4 kV