UNIVERSITY EXAMINATIONS 2019/2020 ACADEMIC YEAR

3RD YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF EDUCATION (SCIENCE)

COURSE CODE/TITLE: SPH B303: PRACTICAL PHYSICS I

END OF SEMESTER: I **DURATION: 2 HOURS**

DAY/TIME: DATE: (PHY LAB)

Instructions to Candidates

1. You should have the following for this examination
   Answer Booklet, examination pass and student ID
2. This paper consists of **3** questions. Attempt **OLNY ONE QUESTION**
3. Do not write on the question paper.

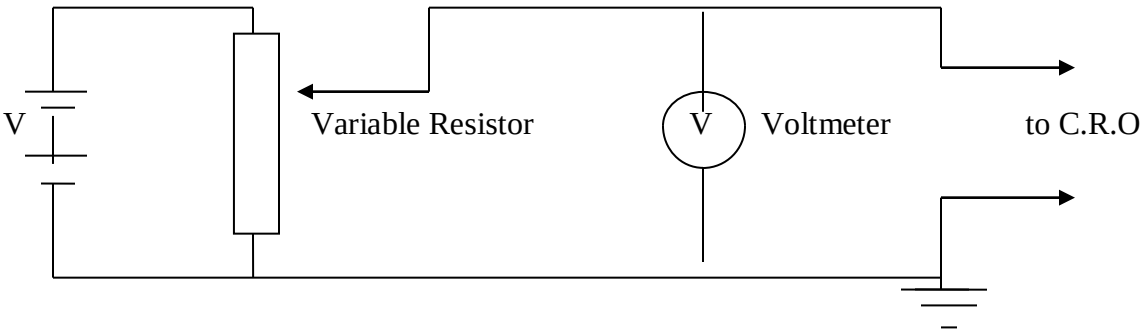
QUESTION ONE (50 MARKS)

APPARATUS:

Cathode ray oscilloscope, Dry cells power supply, Voltmeter (0 – 5V),

Variable resistance (0 – 15 ohms

AIM: The aim of this experiment is to use an oscilloscope to measure potential differences and time intervals, and to display waves –form.



1. Set up the circuit as shown above with the time base of the CRO switched off (fully anticlockwise) choose Y gain (e.g 2 V cm $^{-1}$) suitable for your graph.
2. Plot a graph of the deflection d against the applied p.d. V

3. Describe the relationship between the deflection and the p.d.

4. Use your graph to calculate the deflection sensitivity of the CRO in mm per volt (mm V^{1}). Does your value agree with the calibrated gain control?

Write an elaborate report with the following subtitles;

- Title [1 mks]
- Objective of experiment [2 mks]
- Theory [8 mks]
- Apparatus [2 mks]
- Procedure [5 mks]
- Results [10 mks]
- Discussion of the results and analysis [20 mks]
- Conclusion [2 mks]

Mathematical tables and calculators may be used. The given question paper is your main reference material.

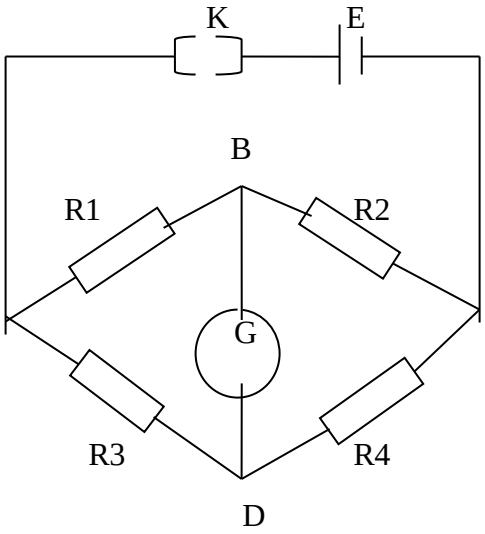
QUESTION TWO (50 MARKS)

AIM: To determine the resistance characteristics of a thermistor

.

Apparatus

Meterbridge, cell, standard resistance box(R) ,Sensitive galvanometer G, switch K, beaker of glycerin, Bunsen burner
S=thermistor
X=shunt



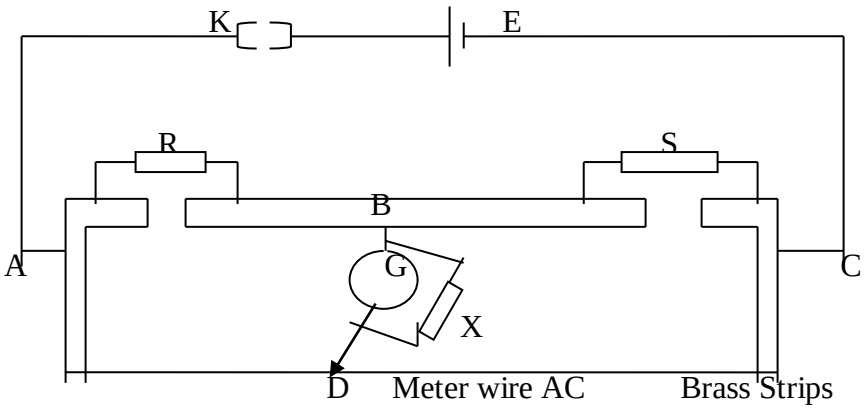


Fig. 28

Use the figure a above to set an appropriate experiment

Note that:

$R_1/R_2 = R_3/R_4$

$$\frac{R}{S} = \frac{AD}{DC}$$

Analysis

The resistance of a wire is directly proportional to its length. The resistance of the thermistor at each temperature may thus be calculated.

$S = \frac{R.L_2}{}$

L_1

Plot a graph of log of the resistance against the temperature.

Worksheet 20

Resistance of resistance box (ohm's)

Temperature ^0C	L_1 cm	L_2 cm	S ohm	Log S

Plot a graph of log S against temperature.

Comment on your results.

Questions

1. Why do you use a shunt on the galvanometer?
2. Why do you use a meter bridge for the measurements rather than a Voltmeter and an Ammeter?
3. Why is it simpler to the log of the resistance of the thermistor against temperature rather than the resistance against temperature ?
4. State two practical applications of the thermistor.

Conclusion

Write a report under with the following subtitles;

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QUESTION THREE (50 MARKS)

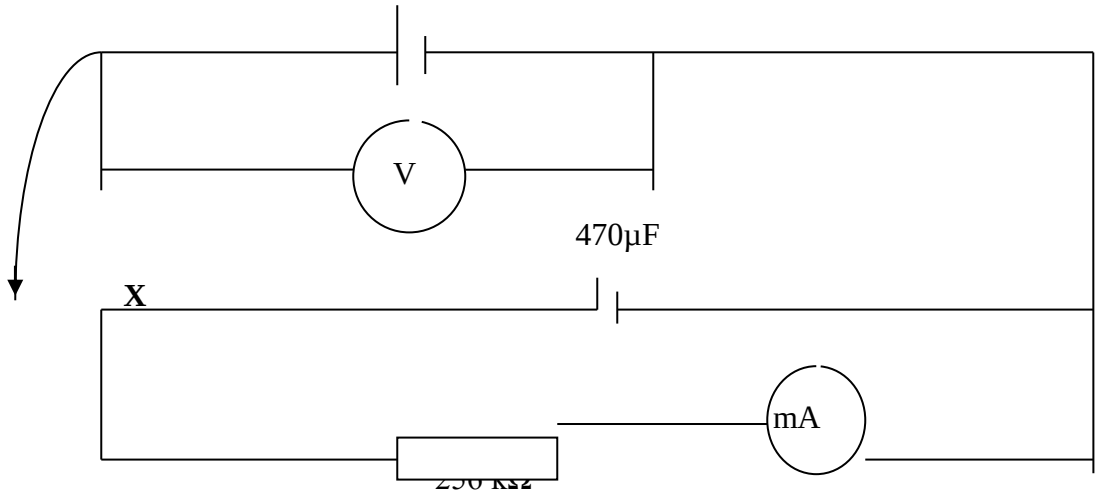
CHARGE AND DISCHARGE OF A CAPACITOR

AIM The aim of the experiment is to study the rate of charge and discharge of a capacitor through a high resistance:

APPARATUS:

D.C. supply of 4.5 - 9v, Voltmeter (0-5V), 2 capacitor (470µf),
3 clip component holders, Resistor 256 kΩ
2 resistors 333Ω, Micro-ammeter : (0-100µA)
Oscilloscope and a Wrist-watch or stop - clock.

Set the circuit as shown in figure below arid record the voltmeter reading V_0



1. The capacitor can be charged and given a p.d Vo. by connecting the flying lead J to point X. Keep. J in contact with X for one minute then disconnect, the flying1ead and record the current through the miro-ameter every 10 seconds as the capacitor discharge for the two minutes

2. It is difficult to record the current I_0 flowing at the instant of disconnection but I_0 can be calculated from the. Voltmeter reading. I_0 is the current flowing through resistance R when the p.d, across the capacitor and across the resistor is V_0 calculate I_0

3. Draw a graph of discharge Current (y - axis)- against time (x—axis) for the period of .2 minutes.

4. Mark on your graph any instant t and record the current I at that instant. Measure the time t, for the current to fall from I to half this value (I/2).

5. Repeat the calculation for three other instances measuring the period t during which the current is halved.
6. What kind of delay curve is the graph of discharge current against time? Give a reason for your answer.

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