JHARSUGUDA ENGINEERING SCHOOL JHARSUGUDA

ELECTRONICS MEASUREMENT & INSTRUMENTATION LAB MANUAL

Prepared by,

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Year & semester: 2[nd]year & 3[rd] sem,

Subject code/Name: Pr-4 Electronics Measurement & Instrumentation Lab

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

VISION OF THE DEPARTMENT:-

To contribute in the nation development in the field of Electronics and Telecommunication by imparting quality education, promoting academic achievement to produce internationally accepted high quality human and technological resource for the country.

MISSION OF THE DEPARTMENT:-

1. To prepare students for a brilliant career/entrepreneurship along with the development of the knowledge, skills, attitude and teamwork through the designed programme.
2. To impart quality teaching-learning experience with state of the art curriculum.
3. To undertake collaborative projects which offer opportunities for long term interaction with academia and industry. Sustained interaction with the alumni, students, parents, faculty and other stake holders.
4. To develop human potential to its fullest extent so that intellectually capable and imaginative gifted leaders can emerge in a range of professions.

INDEX

EXPERIMENT-1

AIM OF THE EXPERIMENT: -

To Study the Constructions of Moving Coil and Moving Iron Instruction and Calibrates

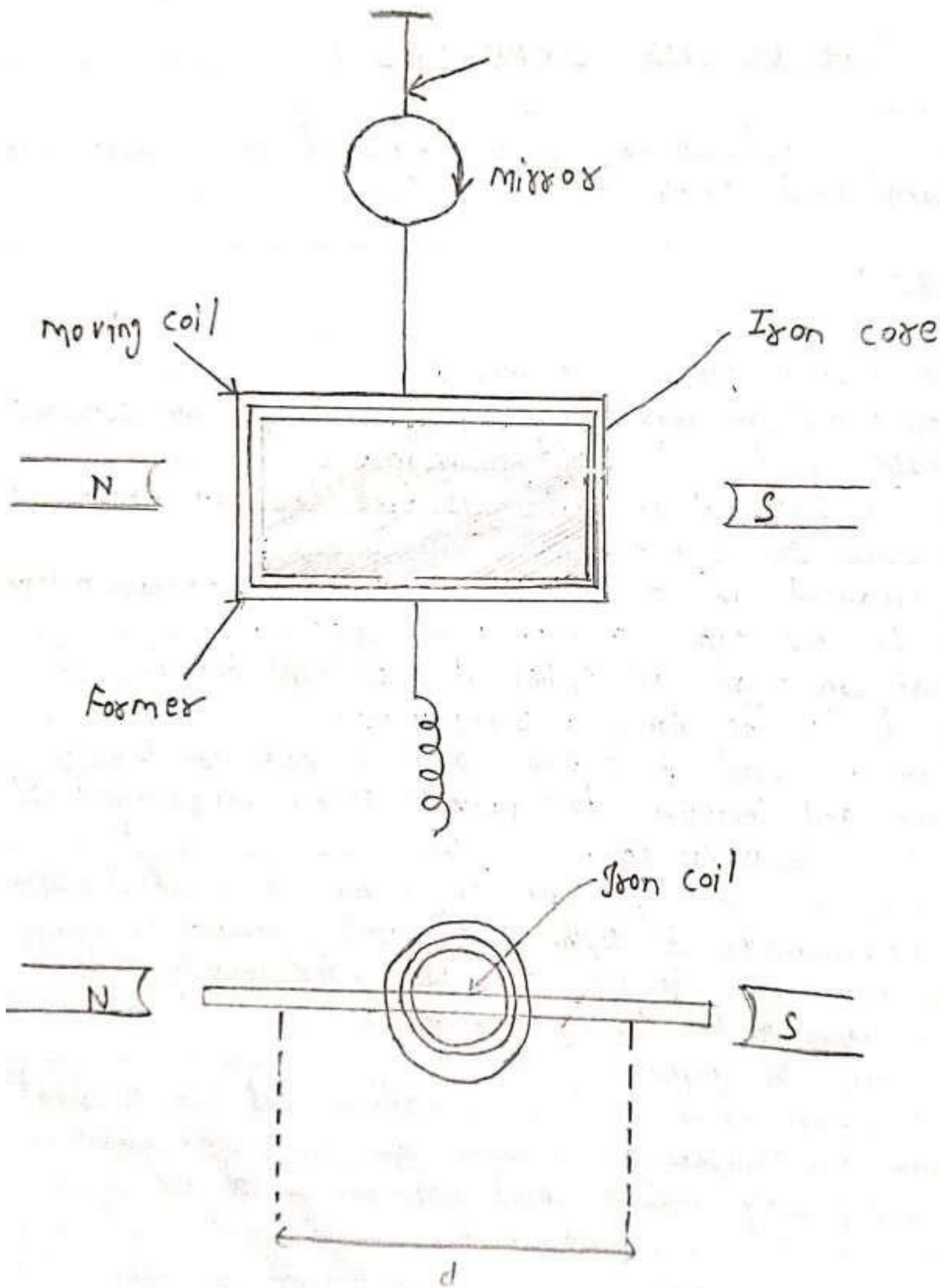
THEORY: -

- It is the current craning elements.
- It is the either rectangular circular in Shape and consist of number of turns of fire wine.
- The coil is suspended is that it is free to turn about its vertical axis of symmetric.
- It is arranged in a uniform radical horizontal magnetic field in the air gap between pole pieces.
- The iron core is spherical in shape but es Cylindrical it the coil is rectangular.
- Iron core is used to provide a flux path of low inductance and therefore to provide strong magnetic field for the coil to move in.
- These increase the deflecting torque and hence the sensitivity about galvanometer, the length of air gap & about - 1.5mm.

- In same galvanometer the iron come is emitted resulting in decreased value of the density and the coil is made barn own to decrease the gap.
- Such a galvanomer is loss sensitive but its moment of inertia is smaller an account of its reduced radius and consequently a short periodic time.

PRINCIPLE: -

- Let a plate is situated so as it can move in a Cool magnetic field produced by a Stationary.
- Let a plate of soft iron or of high permeability steel forms of these System. moving elements for the.


mirror
moving coil
Iron core
N
S
Former
Iron coil
N
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d

- The coil is excited it because an electromagnet and the iron plate mover in a way store to increases the flux of electromagnet.
- The plate traces to occupy a position of minimum reluctance.
- The force reduce is always in such as direction so as to increase the reluctance of the coil.

CONCLUSION: -

Hence, we studied and constructed the moving coil and moving iron instrument.

EXPERIMENT-2

AIM OF THE EXPERIMENT: -

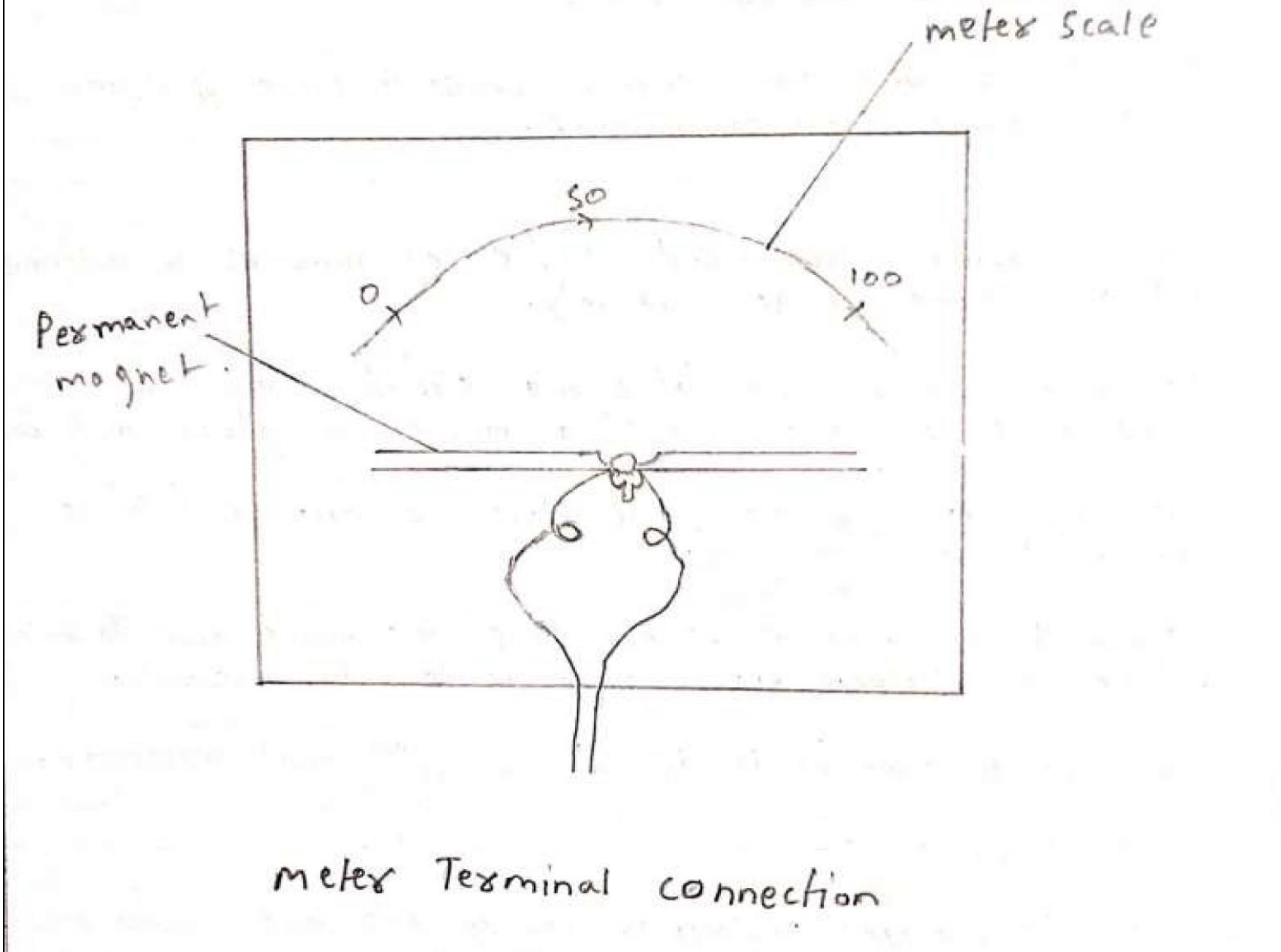
To study of state and dynamic characteristic of PMMC and moving iron instrument.

THEORY: -

- This instrument is used either as ammeter Ott voltmeter and are suitable For DC work only
- The work on the principle that when a circuit canning conductor is placed in a magnetic field a mechanical force act there.
- The circuit current carrying coil place in magnetic field as attacked to the moving system.
- With the movement of the coil the pointer moves over the scale indicate the electrical quantity which is to be Measured.
- This type of movement is known as ‘D’ Aeronaval movement.

CONSTRUCTION: -

- It consists of a light rectangular coil of fine wire wound on. Former which is an iron core.
- The coil as decanally probated upon bearing and I moved between the poles a permanent horse shoves magnet
- Two self-core come pieces are attached to concentrate the magnetic field.
- The current is at into and out of the coil by means of two control hoer springs above and other below the coil.



- The magnetic field in the air gap is due to soft freon care this conductor of the coil
  - The spring also provide controlling. torque the damping torque is provides by former as the coil moves Lobe position to another.

CHARACTERISTICS: -

Definition Torque Equation

moves at Right angles to the field.

- When the current of both side which produce the is pass through the deflection Torque.

- It a current ‘I’ ampere flows is the Coil then the pulse acting in each coil sides is given by

F = (BILM) Newton

The Deflecting torque = Force × Perpendicular Distance

= BINLYD

Td = (BIND)Nm

Where,

B- flux density (wh/m²)

L- Length of Depth of the coil

B- breadth of the coil

N- No of duns of the coil

- The instrument spring the control so that the controlling torque.

Tc × Ø

- The pointer will come to rest at position where,

Td = Tc	Ø × I

- Thus, the deflection is directly preparational to the operating current.
- So, this type of instrument has uniform Scale.

CONCLUSION: -

Thus, we have studied the dynamic Land static characteristics of PMMC and Moving iron instruments.

EXPERIMENT-3

AIM OF THE EXPT:-

Experiment on the Study of Resolution and Sensitivity of a Digital Instrument

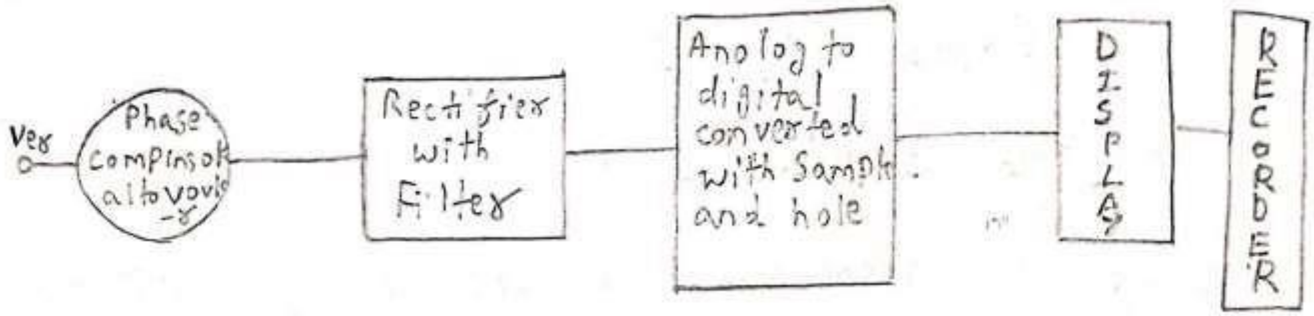
Equipment:-

1. Digital Voltmeter
2. Variable Power Supply
3. Precision Resistors (varying resistance values)
4. Connecting Wires
5. Breadboard (if needed)
6. Multimeter (for reference measurements)
7. Data Recording Sheet

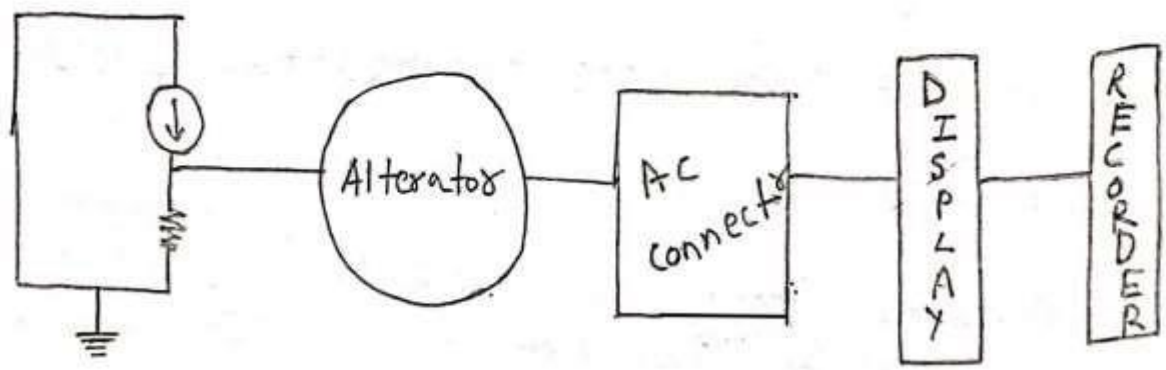
Theory:-

Resolution is the smallest change in a measured quantity that a digital instrument can detect and display. Sensitivity is a measure of the instrument's ability to respond to small changes in the input signal. In this experiment, we will investigate the resolution and sensitivity of a digital voltmeter.

Digital voltmeter



multimeter



Procedure:-

Circuit Setup:

1. Connect the digital voltmeter to the variable power supply and ensure that it is properly calibrated.
2. Set up a simple voltage divider circuit using precision resistors to create a known input voltage to the digital voltmeter.
3. Connect the output of the voltage divider circuit to the input terminals of the digital voltmeter.

Resolution Measurement:-

4. Set the variable power supply to a known voltage, Vx, such as 5V.

Record the displayed voltage value on the digital voltmeter.

Incrementally change the voltage from Vx to Vx+ΔV, where ΔV is a small increment (e.g., 0.1V).

Record the displayed voltage for each step.

Repeat steps 4 to 7 for different values of ΔV, such as 0.01V and 0.001V.

Sensitivity Measurement:

9. Set the variable power supply to a voltage of Vx.

1. Connect a multimeter in parallel to the digital voltmeter to measure the actual voltage.

Slowly change the voltage from Vx to Vx+ΔV (where ΔV is a small increment).

2. Record both the displayed voltage on the digital voltmeter and the measured voltage by the multimeter for each step.
3. Repeat steps 9 to 12 for different values of ΔV.

Data Tabulation:

Voltage Increment (ΔV)	Displayed Voltage (Digital Voltmeter)	Measured Voltage (Multimeter)
0.1V		
0.01V		
0.001V		

Conclusion:

The resolution of the digital voltmeter can be determined by analyzing the smallest change in input voltage that it can display accurately. This is crucial for precise measurements.

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EXPERIMENT - 4

AIM OF THE EXPT :-

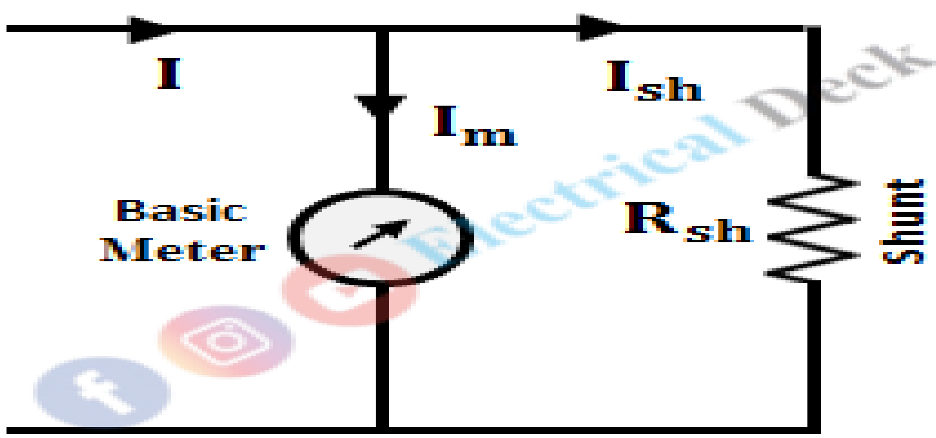
Connecting wires Measurement of Current and Voltage with Low-Range Ammeter and Voltmeter using Shunt and Multiplier

Equipment:-

1. Low-range ammeter (0-1A)
2. Low-range voltmeter (0-10V)
3. Shunt resistor
4. Multiplier resistor
5. Power supply
6. Breadboard (if needed)
7. Precision resistors
8. Multimeter (for reference measurements)
9. Data Recording Sheet

Theory:-

Low-range ammeters and voltmeters are limited in their measurement range. To measure higher currents and voltages, shunt and multiplier resistors are employed. Shunt resistors are used to measure higher currents, while multiplier resistors are used to measure higher voltages.



Procedure:-

Circuit Setup:-

1. Set up a circuit with a power supply, a low-range ammeter, and a precision resistor (R) to create a known current.
2. Connect the shunt resistor in parallel to the ammeter. The shunt resistor's value should be chosen based on the desired measurement range.
3. Set up a circuit with a power supply, a low-range voltmeter, and a precision resistor (R) to create a known voltage.
4. Connect the multiplier resistor in series with the voltmeter. The multiplier resistor's value should be chosen based on the desired measurement range.

Current Measurement with Shunt:-

1. Apply a known current (I) to the ammeter using the power supply.
2. Record the displayed current reading on the ammeter.
3. Calculate the actual current using the shunt resistor and the voltage drop across it (V_shunt) using Ohm's law: I_actual = V_shunt / R_shunt.
4. Repeat steps 5 to 7 for different values of known current.

Voltage Measurement with Multiplier:-

1. Apply a known voltage (V) to the voltmeter using the power supply.
2. Record the displayed voltage reading on the voltmeter.
3. Calculate the actual voltage using the multiplier resistor (R_multiplier) and the current through it (I_multiplier) using Ohm's law: V_actual = I_multiplier * R_multiplier.
4. Repeat steps 9 to 11 for different values of known voltage.

Data Tabulation:-

Current Measurement with Shunt:

Known Current (I)	Displayed Current (Ammeter)	Actual Current (I_actual)

Voltage Measurement with Multiplier:

Known Voltage (V)	Displayed Voltage (Voltmeter)	Actual Voltage (V_actual)

Conclusion:-

Shunt resistors and multiplier resistors are essential components for extending the measurement range of low-range ammeters and voltmeters.

EXPERIMENT-5

AIM OF THE EXPERIMENT: -

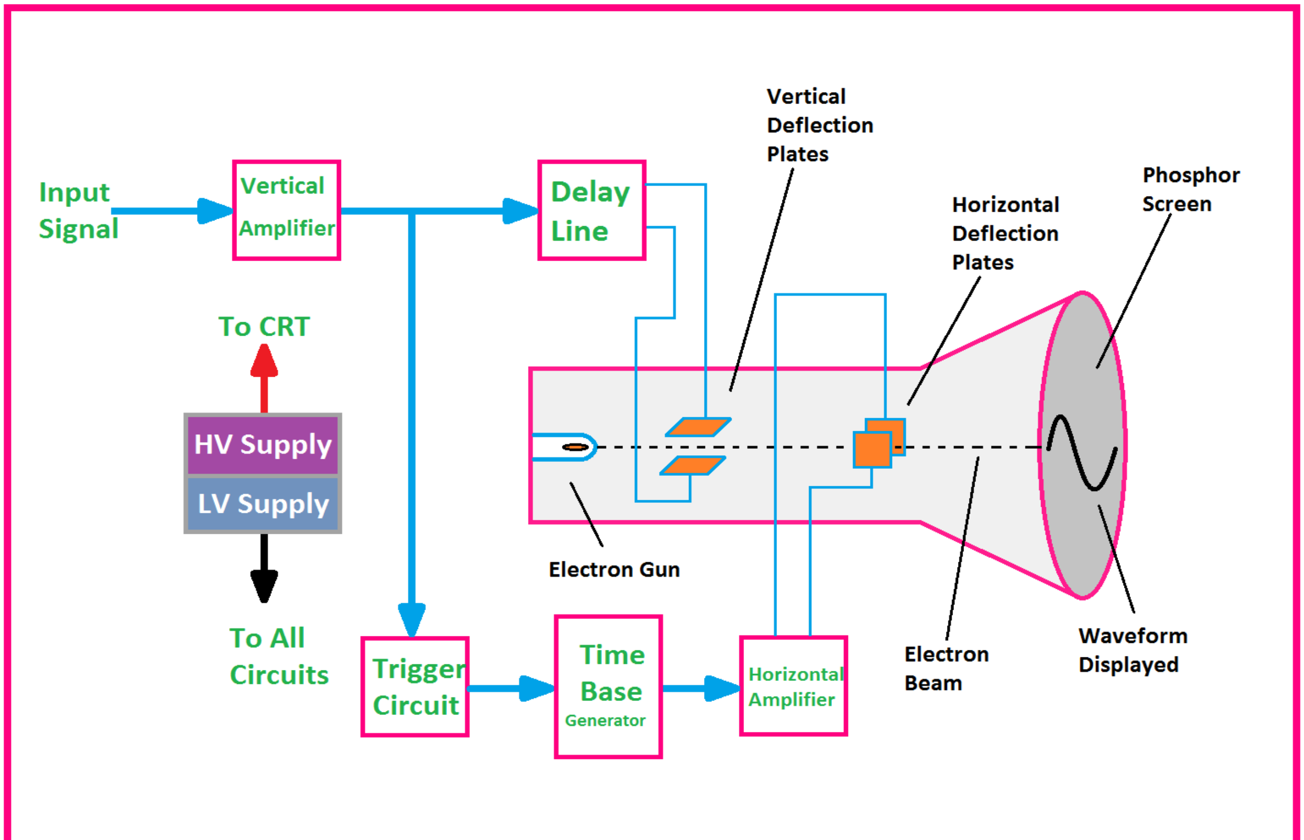
To Study the Difference wave form using cathood Ray oscilloscope CRO. using different frequency by function-generator and CRO.

EQUIPMENT REQUIRED: -

- CRO kit
  - 2 Function generator 1
  - 4 BNC Chord Digital 2

THEORY: -

- The CRO is extremely useful for studying the wave shape of alternating current and voltage as well as for measurement of voltage, Current, power and frequency.
- Most of the oscilloscope are monochromatic (or) colored oscilloscope whose application use found in computers and televisions.
- Now a days modern oscilloscope. are capable of accepting 2 (or) make input display and it is achieved using a split beam com by using multibeam tube.

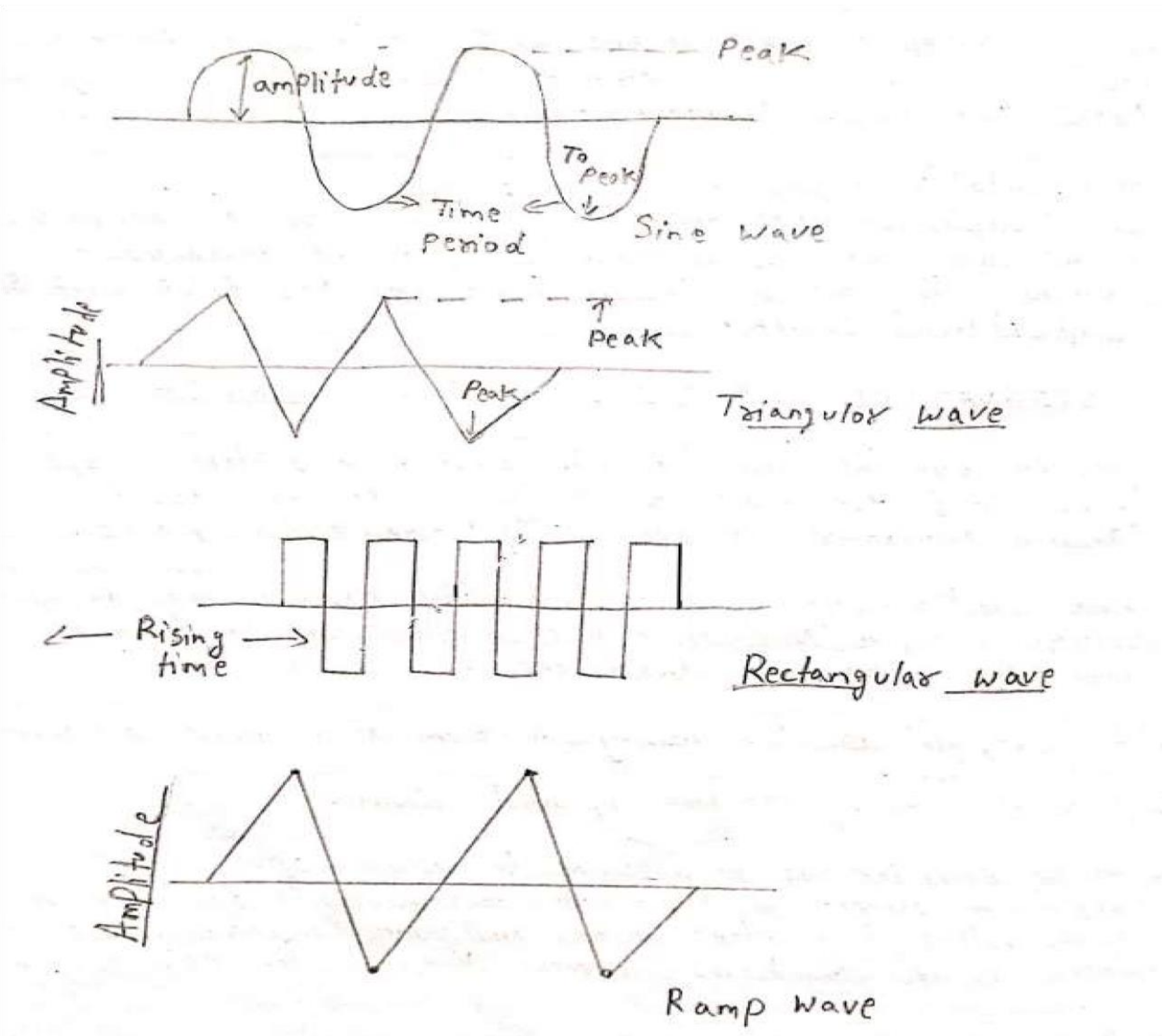


CRO Block Diagram

BASIC CRO CIRCUITS: -

<u>Vertical (Y) deflection Circuit: -</u>

- The signals are applied to y deflection plates through an attenuator an amplifier Stage.
- It is required because signal isn't enough to produce measurable deflection, g for high voltage signals, it must be 1st attenuated and applied to synchronizing amplifier, which permits horizontal Sweep CKT to be triggered. <u>Horizontal (X) deflection Circuit: -</u>
- The x deflection plates are fed by a sweep voltage that provides a time base, when voltage is of sufficient magnitude.
- Externally they are fed through horizontal amplifies with the sweep selector Switch.



OBSERVATION OF THE WAVE FORM CRO: -

- To observe the wave form, the wave form voltage is applied to wide deflection plates and the voltage obtained from sawtooth generator is applied to x- deflection plates.
- When simultaneously with the Horizontal Ramp voltage an input voltage is applied vertical deflection plates then the beam is under the influence of the two forces: -

a. In horizontal direction moving the beam at a linear rate from left to right.

b. Is vertical direction moving beam up and down.

- As the deflection is proportional to voltage applied to the deflection plates the horizontal movement B proportional to the voltage to X plates at any and the Ramp voltage is linear as it traces, straight line on the CRT screen mag the spot

- The vertical is proportional to the voltage applied to y plater and the beam moves up and down according to the petude and polarity drops down and is immediately transferred to its original position.

- To observer more than one cycle of input voltage the sweep voltage p frequently has to the be a sub-multiple of input voltage frequency.

CONCLUSION: -

Hence, we studied the wave from et different frequency by using function generator and

CRO.

EXPERIMENT-6

AIM OF THE EXPERIMENT-

To Measure +ve Unknown, Frequency and Phase Angle using CRO by Lissajous figure.

APPARATUS REQUIRED: -

- CRO
- Connecting wires
- AC supply

THEORY: -

A simple method of determining the frequency of a signal is to estimate its periodic time from the force on the screen at a CRT However this method has limited accuracy and should only be used where other methods are not available. To calculate the frequency of the observed signal, one has to ensure the period, i.e. the time m taken for I complete cycle: wing the calibrated sweep scale. by period could be calculated

T = (no of squares in cm) (selected Time / Cm Scale)

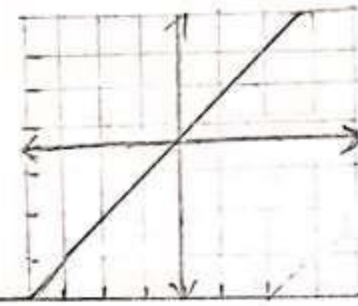
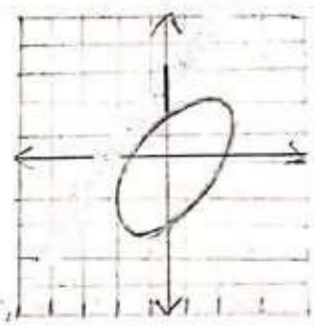
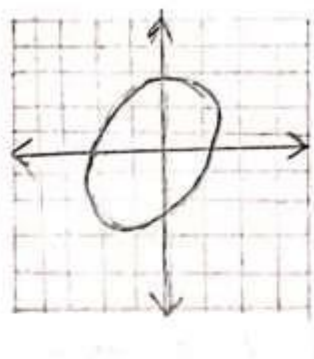
Once the period I is known the frequency is given by.

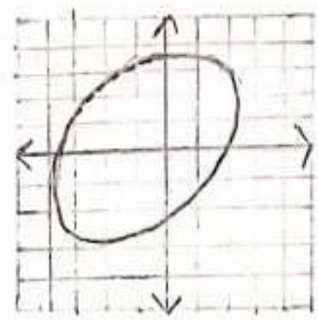
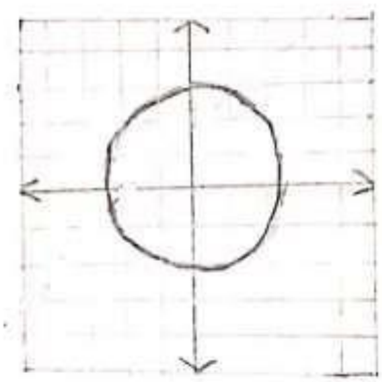
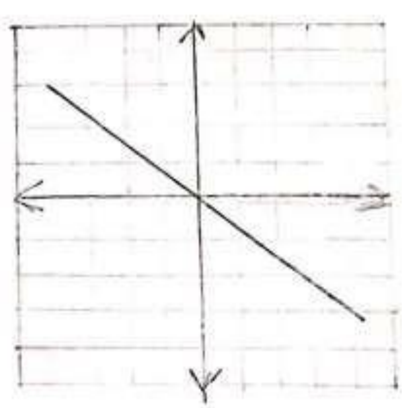
F(Hz) = 1/7 Sec

Measurement of phase angle (Ø)

- CRO is Important electronic device. CRO is very useful to analyze the voltage wave form of different signals, the main part of CRO is CRT.
- when both pairs of the deflection plates of CRO are connected to two sinusoidal voltages pattern.

- Shape of their Lissajous pattern changes, with changes of phase difference between signal and ratio of frequency applied to the deflection plate of CRO.
- The Lissajous figure have two application signals to calculate phase afference between two Sinusoidal signals. having same frequency.

SL No	Phase different between two current(φ)	Lissojous fig/Pattern appeared at CRo screen.
1	0°	
2	30°	
3	45°	

Sl No	Phase difference between two circuit (ϕ)	Lissajous fig / pattern oppeared at CRO screen.
4	60°	
5	$\phi : 90^\circ$	
6	$\phi = 180^\circ$	

PROCEDURE: -

- When calculating/measuring the unknown frequency, firstly we have to connect the input to the CRO
- Then the obtained patten i's come into play
- We have observed the signal and calculate that the one cycle of signal has taken how many boxes on the CRO Screen.
- Then by formula we have successfully calculate then by Unknown frequency.
- When measuring the phase difference (Ø) Between Two Given Current.
- At the First Connect the two inputs to the CRO
- This pattern which is obtained on a CRO Screen in called Lissajous pattern By the Lissajous pattern.
- We have successfully measured the phase angle between the given two current.

CONCLUSION: -

The Measurement of unknown frequency and phase angle have been done Successfully

EXPERIMENT-7

AIM OF THE EXPERIMENT: -

To measure the unknown Resistance by using Wheatstone's bridge.

APPARATUS REQUIRED: -

- Wheatstone bridge
- Multimeter
- Connecting prober
- AC supply (230V)

THEORY: -

A Bridge circuit in its simplest from Consists of network of four resistance arms Forming a Class Circuit, with a DC Source of Current applied to two opposite junctions and a current detector Connected to the other Two Junction.

Wheatstone's bridge Consist of a f resistor let R_1, R_2, R_3, and R_4 Where R_3 Is a variable resistor and R_4 is the resistor which value is to be measure. The bridge can be balanced by varying the R_3 resistor.

When Current flows, it duwendes into two
arms at point A i.e. I1 and I2. The bridge will balance When there is no Current through the Galvanometer.

To obtain bridge balanced condition →

$$VAD = VAB$$

$= I_1R_1 = I_2$ ———————— (i)

$VDC = VBC$

$= I_1 R_3 = I_2 R_4$ ———————— (ii)

Then,

$I_1 = I_3 = E/R_1+R_3$ ———————— (iii)

$I_2 = I_4 = E/R_2 +R_4$ ———————— (iv)

$I_1 R_1 = I_2 R_2$

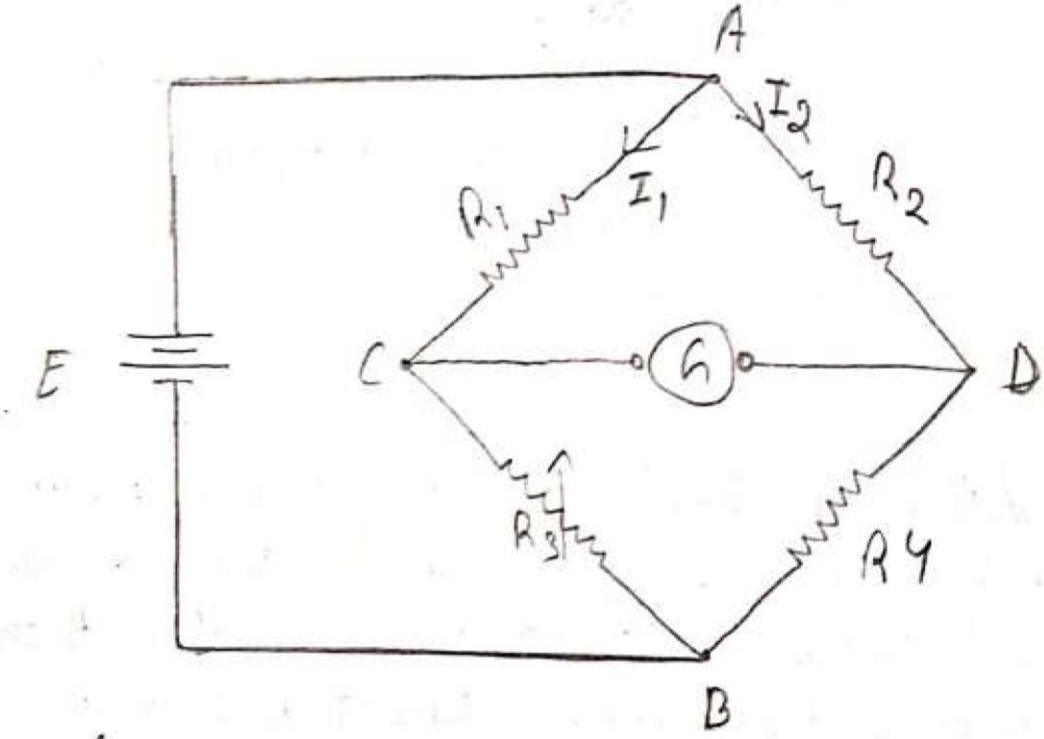
$$= \frac{ER_1}{R_1+R_3} = \frac{ER2}{R2+R4}$$

$$= \frac{R_1 (R_2+R_4)}{R_1+R_3} = R_2$$

$= \cancel{R}1\ \cancel{R}2 + R1\ R4 = \cancel{R}1\ \cancel{R}2 + R2\ R3$

$$= R_2 = \frac{R_1R_4}{R_3} = R_4$$

$$= R_4 = \frac{R_2R_3}{R_1}$$



(Wheatstone Bridge)

$$R_4 = \frac{1500 \times 1000}{720}$$

$= 2.08\ K\ \Omega$

PROCEDURE: -

- Take the trainer kit, Measure the Resistance of R_1, R_2 and variable resistor R_3 except R_4.
- New insert its mains cord in main 230 v supply plug and switch ON. (Measure the De supply Voltage £2/24
- By Varing the R_3 resistor, trying to balance the bridge.
- Once the null reading is found, remain all the jumpers and measure the value of R_3. Put the R_3 value in the formula and calculate R_4.

CALCULATION: -

$$R_4 = \frac{R_2 R_3}{R_1}$$

R1 = 1 K Ω
R2 = 1.5 K Ω
R3 = 72O Ω

CONCLUSION: -

From the Above Experiment We are Learn To Measurement of unknown Resistance by Wheatstone bridge is successfully done in the above experiment.

EXPERIMENT -8

AIM OF THE EXPERIMENT : -

Measurement Inductance by Maxwell's & Hay's Bridge

EQUIPMENTS REQUIRED :-

1.LAB hay's bridge trainer

2. CRO.

3.DMM

4.Decade inductance box

5.Set of patching wires .

THEORY:-

The hay's bridge , shown in figure is used for the measurement of inductance and the Q of the inductor .it is intresting to note that this type of bridge measures inductance by comparing it With a standard capacitor of known characteristics .this arrangement provides the advantage Of a wide measurement range with the minimum use of electronics parts as comparision Standards .A typical range of values that can be measured with the hays bridge is from 10µH to 1H.

The hay's bridge given below differs from the Maxwell bridge by having resistor R1In series with Standard capacitor C1instead of that in parallel .it is immediately apparent that for large phase Angles R1 should have a very low value. The hay's circuit is therefore more convenient for Measuring high –Q coils.

The balance equatios are again derived by substituting the values of the impedance of the bridge arms in general equation for bridge balance .

For the given circuit , we find that

$Z1 = R1 - (j/\omega c1)$; $Z2 = R2$; $Z3 = R3$; $ZX = RX + j\omega LX$

Substituting these values in equation ,$Z1Z4 = Z2Z3$, we get

$[R1 - (jx/\omega c1)]\ RX) + j\omega LX) = R2R3$

(1) This expands to R1RX + LX/C1) – (jRX/ωc1) + jωLXR1 =R2R3
 Separating the real and imaginary terms,
we obtain R1RX +LX/C1=R2R3
 (2) And RX/ωc1 =ΩlXR1
 (3) Both Eq.(2) and Eq. (3) contain L and R, and we must solve these equations simultaneously.
This yield
RX= ω 2C1 2R1R2R3 1+ω 2C1 2R1 2 LX = R2R3C1/1+ω 2C1 2R1 2

These expressions for the unknown inductance and resistance both contain the angular velocity ωand it therefore appears that the frequency of the voltage source must be known accurately. This is not true when a high –Q coil is being measured from the following

 considerations :
 remembering that thesum of the opposite sets of phase angles must be equal, we find that the inductive phase angle must be equal to the capacitive phase angle ,since the resistive angles are zero. The following figure shows that the tangent of the inductive phase angle equals the frequency .

DIAGRAM :

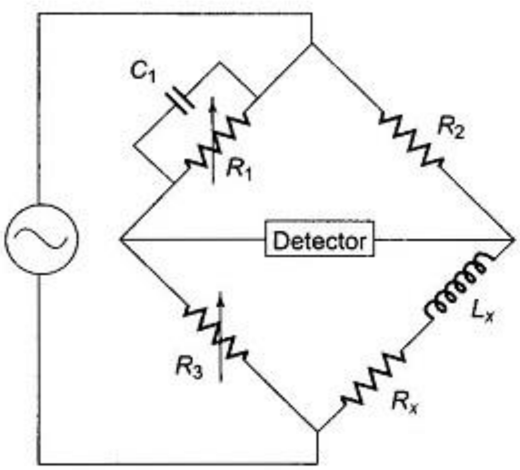
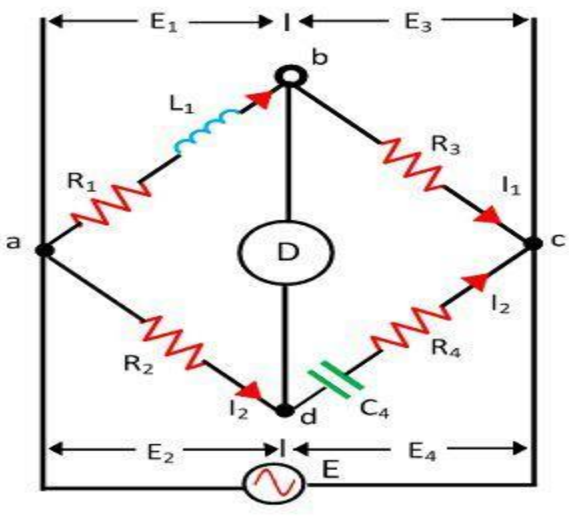


Fig. 11.21 Maxwell's Bridge



Hay's Bridge

PROCEDURE:-

1. Switch on the trainer & check the power supply to be +15V.
2. Connect the unknown value of inductance (high Q) in the arm marked LX.
3. Observe the sine wave at the output of 1KHz oscillator & patch the circuit using the wiring diagram.
4. Observe the sine wave at the secondary of the isolation transformer on an oscilloscope.
5. Select some value of R3 .
6. Connect the oscilloscope between ground & the output point .
7. Vary R1(10K potentiometer) from the minimum position in a clockwise direction .
8. If the selection of R3 is correct , the balance point NULL POSITION (DC line) can be observed on the oscilloscope, that is at balance the output waveform comes to a minimum voltage for a particular value of R1& then increases by varying R1in the same clockwise direction .if that is not the case, select another value of R3.
9. Vary R2 for fine balance adjustment .
10. The balance of bridge can also be observed using headphone . Connect the output of the bridge to the input of the detector.
11. Connect the headphone at the output of the detector . Alternately adjust R1& select R3 For a minimum sound in the headphone .
12. Finally disconnect the circuit and measure the values of R1 at balance point using multimeter . By substituting the values of R1,R3, & C1, the the unknown value of inductance LX= R1R3 C1 can be obtained.

CONCLUSION: -

EXPERIMENT-9

AIM OF THE EXPERIMENT: -

To measure unknown capacitance using Schering bridge.

APPARATUS REQUIRED: -

- Schering bridge trainer kit
- Connecting probes
- Multimeter
- AC Supply (230V)

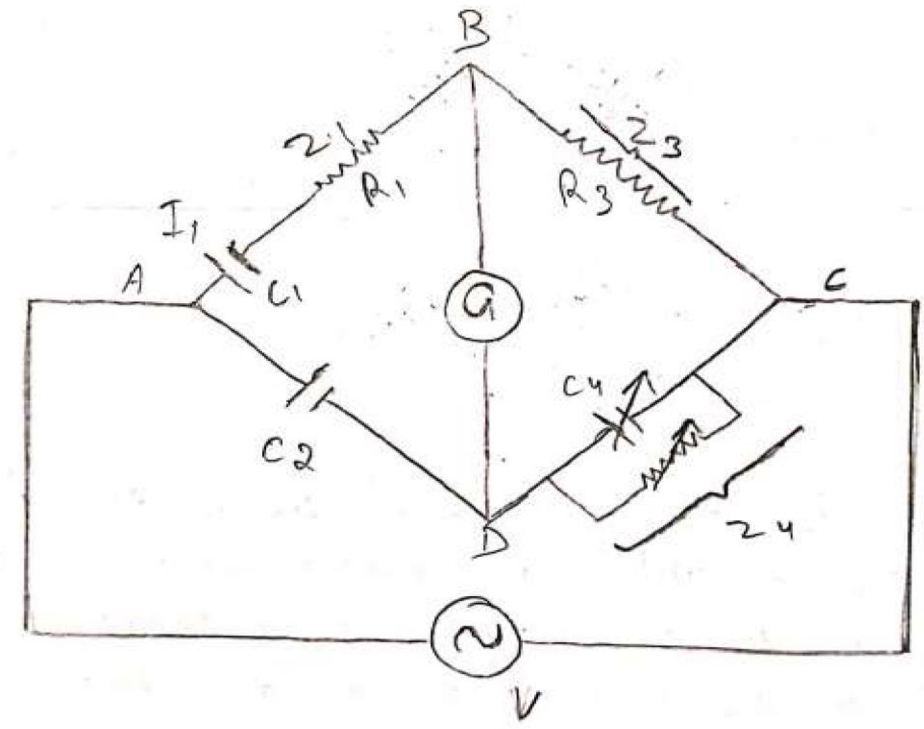
THEORY: -

- Schering bridge is electric al circuit and is most popular used to measurement of unknown capacitance.
- This bridge consists of 4 cms containing in AB arm consist of a capacitor (C.) which value is to be measure on series with a standard Resistor (R_1).
- BC Arm consist of a single standard resistor R3. AD arm consist of a standard Capacitor C R4 is a pure resistor and is variable connected in parallel with a variable capacitor C_A.

The bridge will balance when,

$$Z_1 Z4 = Z2 Z3$$

$$Z_1 = R_1 + \frac{1}{JWC_1} \qquad\qquad Z_3 = R3$$



(Schering Bridge)

$$R1 = \frac{R3\ C4}{C2}$$

$$CA = \frac{RA\ CA}{R3}$$

$$Z_2 = \frac{1}{JWC_2}$$

$$Z_4 = \frac{R_4}{1+JWC_4R_4}$$

PROCEDURE: -

- Take the Trainer kit on the work table and put it in 220v AC port
- Switch ON the trainer kit, and connect the probes as per the CKT diagram in the lab manual.

- By changing the variable components values. Cand Robe can get a point where there is no deflection in the galvanometer
- Now the bridge is in balanced condition, switch of the connection and taken measurement of all elements i.e., C_1, C_2, R3, CA, R4.
- Recorded all the values for further Calculation.

CONCLUSION: -

The measurement of capacitance by using Schering bridge has done successfully.

EXPERIMENT-10

AIM OF THE EXPERIMENT: -

To measure the resistance, capacitance of Circuit (series and parallel using LCR meter and to find by us factor of the coil.

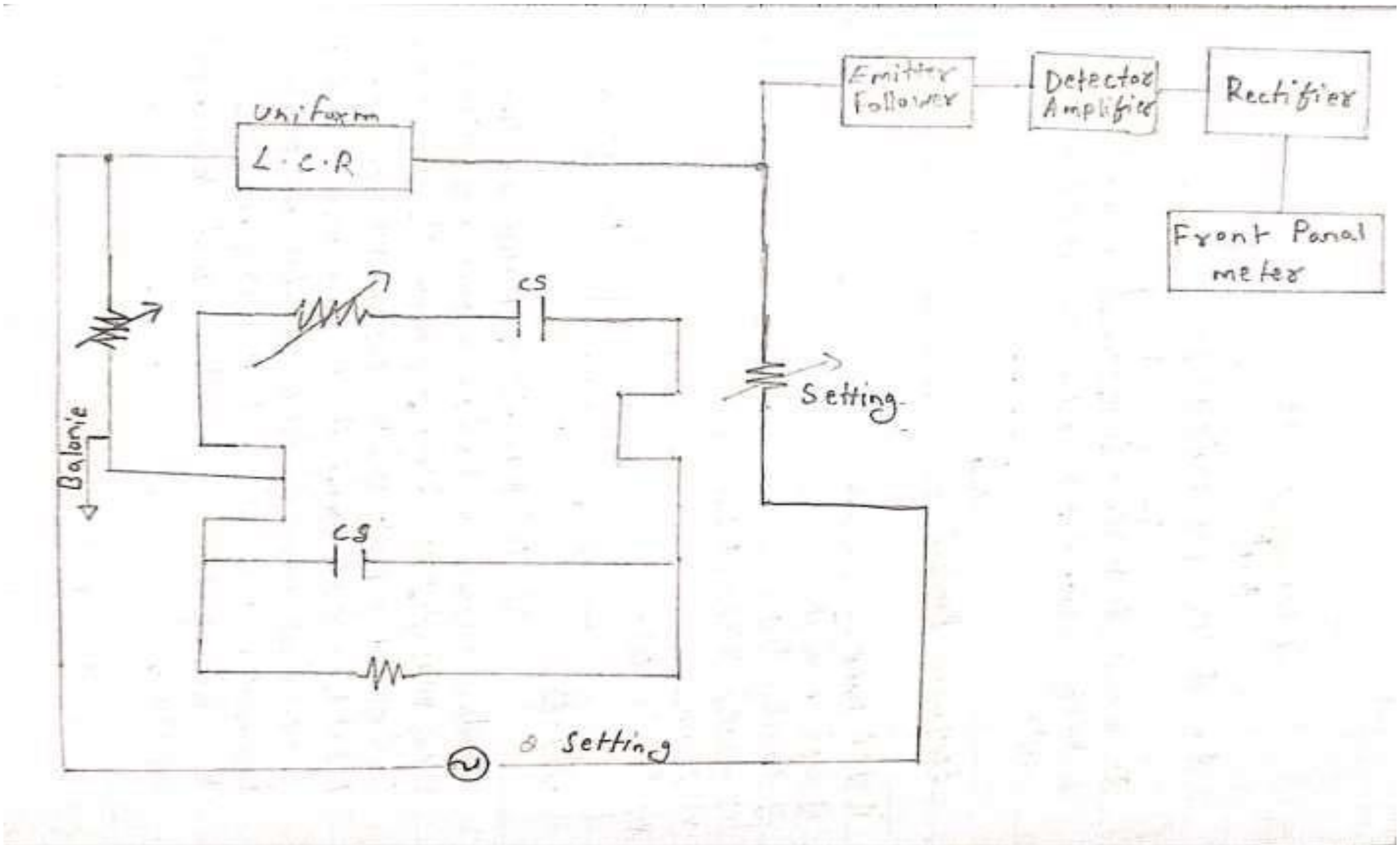
EQUIPMENT REQURIED: -

- LCR meter
- Digital multimeter
- Connecting Probes
- Resistor 4.7 Ω, 10K Ω
- Capacitor
- Inductor coil

THEORY: -

The LCR o bridge 6018 measure inductance capacitance resistance and with a basic accuracy of 10.25% of reading values up to 2000 H 2000F and 99 respectively either serries equivalent or parallel equivalent lant component values are displayed LCR- O bridge is auto ranging it select range automatically and also it discriminates de automatically between inductors and capacitor Frequencies of measurements is 100 Hz 1KHz. An internal Dr Bice voltage of 2V Can be selected for use when testing electrolytic Capacitors.

PROCEDURE: -



- Connect the LCR meter to the main supply, then connect the measurement to positive and negative side.

- Then check it with a Same thing to check in reading basic accuracy at a measurement frequency of 100 Hz.

- LCR. & Is capable of and parallel equivalating both series Components at freequienegies of and 1KH₂.

OBSERVATION: -

TABLE: -

SL NO	LIST	SERISE VALUE	PARALLEL VALUE
1	Resistor (1K + 11K Ω)	24 Ω	4 uf
2	(2204F + 404F)	260 uf	14.19 uf
3	Inductor	20Mf	2 mf
4	Resistance & Capacitor	26 uf	16.19 uf

CONCLUSION: -

From the above experiment we have successfully studied about that measured. Q is less than is actual O.

EXPERIMENT-11

AIM OF THE EXPERIMENT: -

To the Measure Displacement Using LYDT

APPRATUS REQUIDED: -

- LVDT
- LVDT Trainer Kit
- Connecting probe
- Multimeter
- AC supply (230V.)

THEORY: -

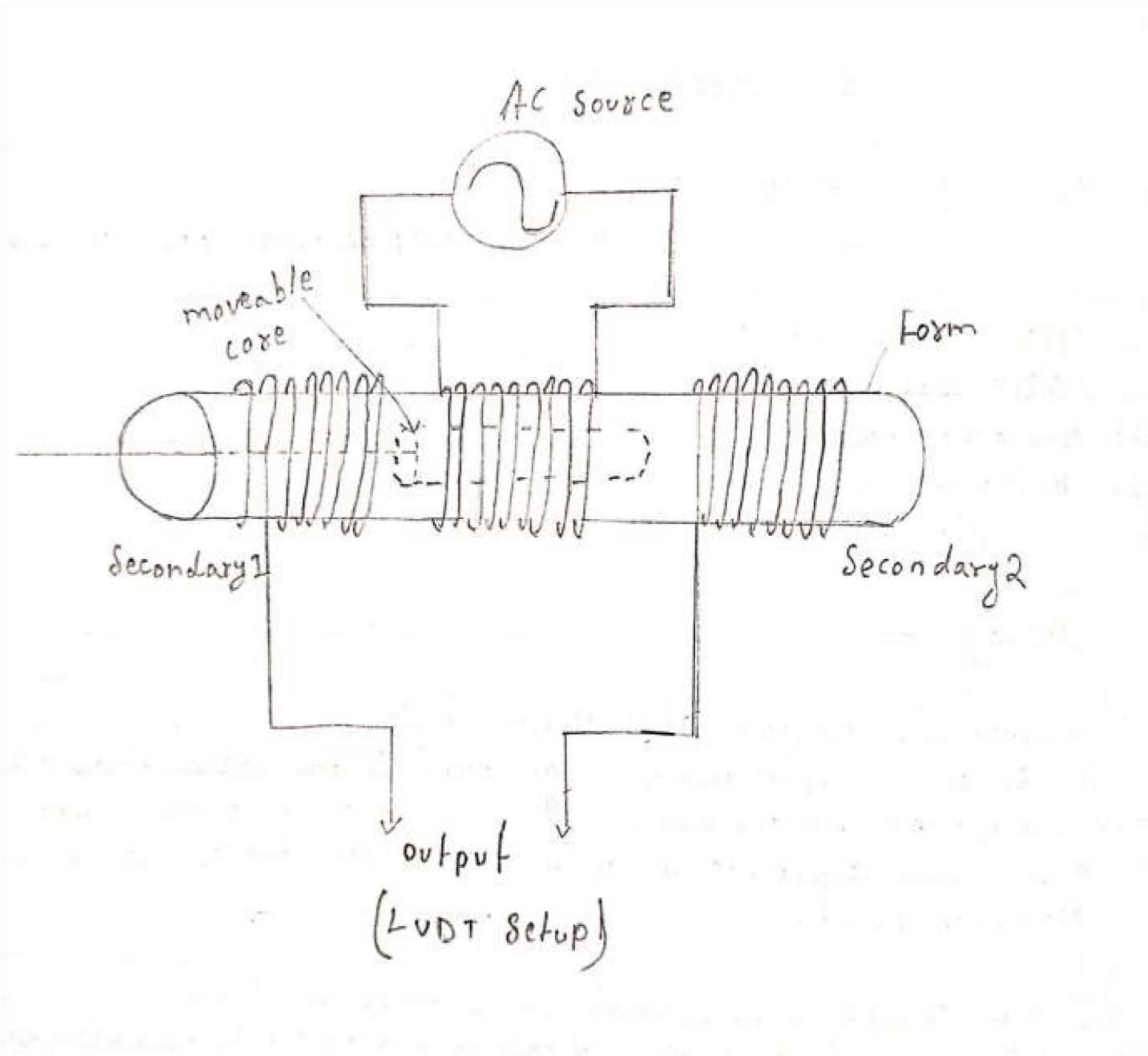
Linear Displacement Measurement: -

Linear displacement is movement in one direction along a single ours. A position displacement sensor it a device whose output signal represents the distance and from a reference point. object has traveled

Linear variable Differential Transformer: -

LVDT are used to measure displacement LVDT operates on the principle of a transformer An LYDT Consist of a Coil Assembly and a Come. The coil Assemble is Typically mounted to stationary form, which the cede es. secured to the object whose position is being measured, the Coil assembly consist of the coils of were wound on the Hollow.

From a core of permeable material can slide freely through the center of the form. The inner coil is the primary ceil Ps the primary, which is excited by AC source. magnetic fleur produced by the primary is cabled to the two secondary coils, inducing AC voltage in Each coil.



PROCEDURE: -

i. Connection is made as per own requirement for the given experiment. ii. Initially the Set-up care of LVOT at center.

iii. Change the core displacement 1mm in are direction and observing the corresponding outa Voltage in DMM.

iv. Repeat the steep for 5 times and take reading

TABULATION: -

SL NO	DISPLACEMENT (MM)	O / P VOLTAGES (MV)
1	0	0.7
2	1	9.1
3	2	17.9
4	3	26.3
5	4	35.4
6	5	44.6

CONCLUSION: -

From the Above Experiment We are Learned How to Measurement the Displacement LYDT has been done successfully.

EXPERIMENT-12

AIM OF THE EXPERIMENT: -

To the Measure the temperature by using RTD Thermister .

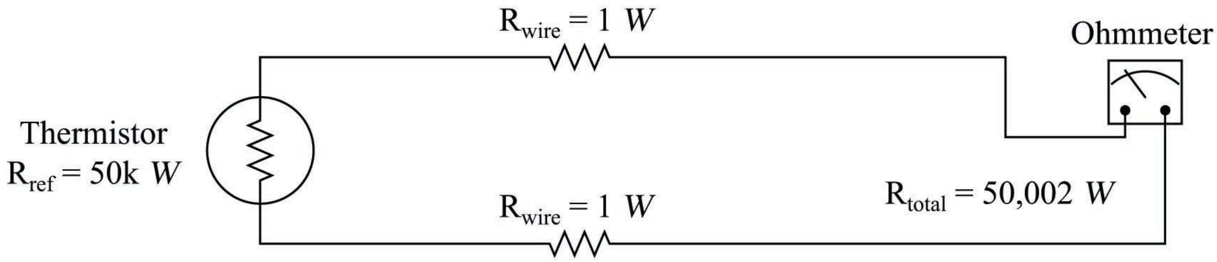
APPARATUS REQUIRED: -

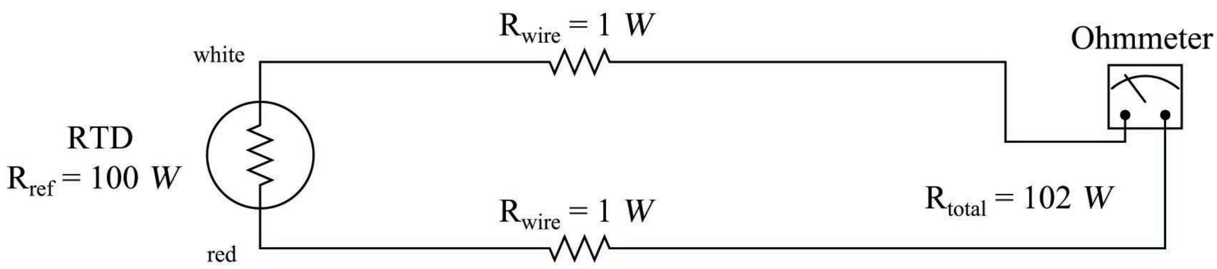
- RID Trainer Kit
- Measuring instrument
- Beaker for Controlling

THEORY: -

A platinum Resistance temperature detector (RTD) is a device with a typical resistance of 100n at 0°c. It consists of wo thin film of platinum on a plastic film its resistance varies with temperature and it can typically measure temperature up to 850 °C. coercion through a RTD generates a voltage access the RTD. By measuring this Voltage, we can determine it resist once and thus the temperature. The relationship between resistance and temperature is relatively

RTD are Constructed using one of two different manutracturing configurations. wirewound RTD are created by winding a thin wine into a coil. A mode Configuration is the thin film element, which consist of a very thin large of metal laid out a plastic or cadmic Subdrain.





PROCEDURE: -

i. Placed the beaker Containing water.

ii. Place an immersion rod in the Retaker. iii. Keep the RTO prove in the beaker.

iv. To connect the spin main plug of set up Maine seeker.

v. to Connect the output signal with a digital plane meter.

TABULATION: -

SL NO	TEMPERTURE (C◦)	RESISTANCE (Ω)
1	00	100.00
2	10	103.90
3	20	107.79
4	30	111.67
5	40	115.54
6	50	119.40
7	60	123.24

CONCLUSION: -

Heave thy measurement of tempestive RID has been done by above experiment