Determine the poles and plot the field of a magnet bar

Objectives: At the end of this exercise, you shall be able to
- **determine the polarity of a permanent magnet**
- **trace the magnetic field of the given magnetic bar**
- **trace the magnetic lines with the aid of a compass needle and iron filings.**

Requirements

Tools/Instruments

- Bar magnet 12 x 6 x 100 mm - 2 Nos.
- Compass needle 10 mm diameter. - 1 No.

Materials

- M.S.bar 12 x 6 x 100 m or (make a M.S. bar to the size of the bar magnet available) - 1 No.
- Thread (tensionless) - 1 m
- Iron filings - 25 gms
- Iron nails - 25 gms.
- Aluminium wire - a few pieces
- Copper wire - a few pieces
- Cotton thread sleeve - a few pieces
- Wood chips - a small quantity.
- Paper pins - as required.

PROCEDURE

TASK 1: **Determine the pole of a permanent bar magnet**

1 Suspend the magnet as shown in Fig 1 with a tensionless thread.

2 Observe the direction of the poles of the suspended magnet.

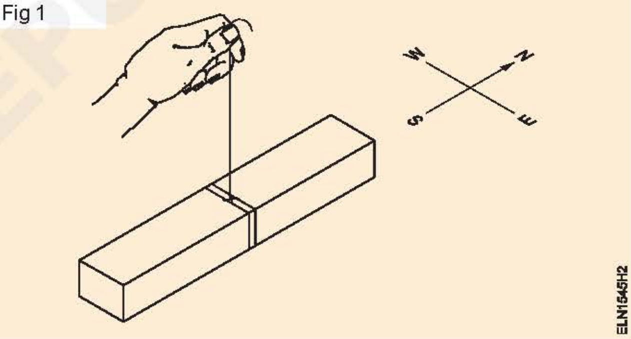
3 Mark the polarity N on the free end of the suspended magnet that points (seeks) at the north direction of the earth.

4 Reorient the position of the suspended magnet to cofirm the polarity.

5 Check the identified pole with a magnetic compass.

The compass needle must not be taken near the poles of the bar magnet.

Fig 1



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TASK 2: **Trace the magnetic path of the given magnetic bar**

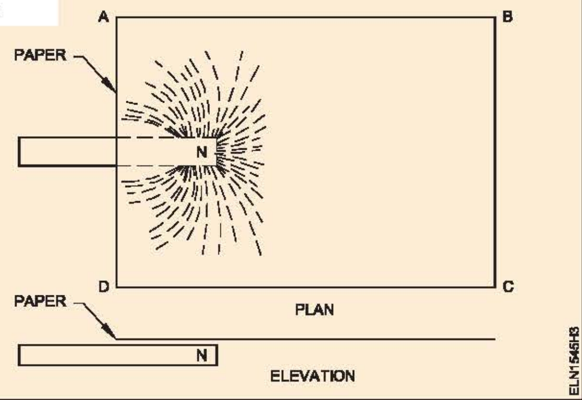
1 Place the bar magnet's north pole underneath the paper as shown in Fig 2. Sprinkle some iron filings on the paper.

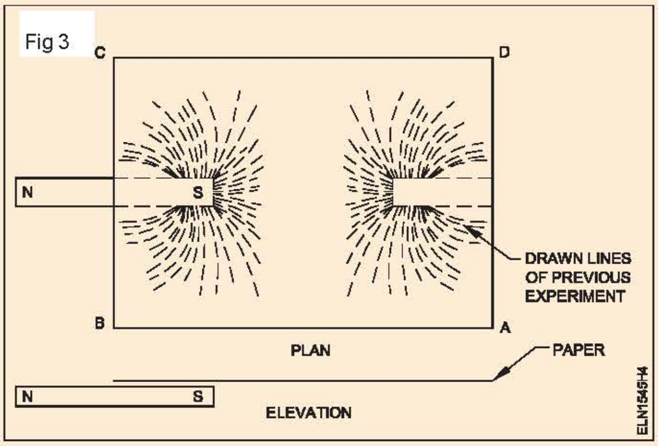
2 Tap the paper gently on all the corners. Observe the random filings getting oriented into a definite pattern.

3 Gently draw lines along the orientation of the iron filings with a pencil. Repeat the expriment for the other pole as shown in Fig 3.

4 Place the bar magnet underneath a thin cardboard as shown in Fig 4. Sprinkle some iron filings. Gently tap the paper to orient the iron filings and trace the magnetic path with a pencil.

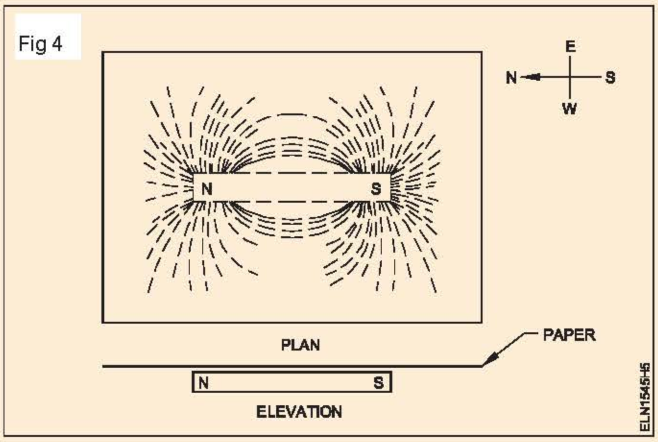
Fig 2

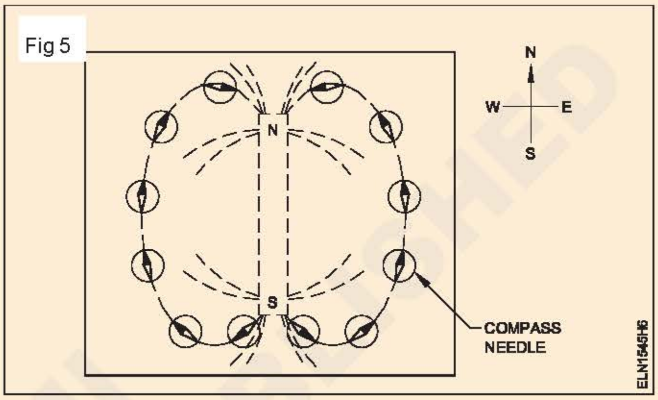




5 Place another thin card over the bar magnet as shown in Fig 5. Trace the magnetic lines using a compass needle by positioning the needle in the required areas..

> **For steps 4 and 5, the bar magnet should be oriented in the geometrical north-south direction.**
>
> **Do not use a strong bar magnet for mapping the field with a compass.**





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Wind a solenoid and determine the magnetic effect of electric current

Objectives: At the end of this exercise you shall be able to
- **prepare a bobbin**
- **select the suitable wire and make the winding for solenoid**
- **determine the pulling strength of a solenoid.**

Requirements

Tools/Instruments

- Combination pliers 150 mm - 1 No.
- Screwdriver 100 mm - 1 No.
- Screwdriver 150 mm with 3 mm blade - 1 No.
- Magnetic compass 12 mm diameter - 8 Nos.
- Rheostat 10 Ohms, 20A - 1 No.
- MC Ammeter 0-10A - 1 No.
- MC Ammeter 0-30A - 1 No.
- MC Voltmeter 0-15/0-25V - 1 No.

Equipment/Machines

- Battery 12V, 80 or 100AH or variable voltage source DC 0-25V, 30A - 1 No.

Materials

- Iron filings - 50 gms
- Connecting leads - as reqd.
- DPST knife switch 16A/ 250V - 1 No.
- Enamelled copper wire 16SWG - 50 cm
- Paper pins - a few
- Terminal post 16A - 2 Nos
- SPST knife switch 16A / 250V - 1 No.
- PVC insulated cable 4 sq.mm 250V grade - 4 m.
- Barrator resistor 0.48 ohms 250W - 1 No.
- Cardboard A4 (R 48) size - 1 No.
- Bare copper wire 4 sq.mm - 1 m.
- Porcelain connectors 2-way 32A - 2 Nos.
- Transparent sheet of plastic, A4 size, 3 mm thick - 1 No.
- PVC saddles 50mm - 2 Nos.
- PVC pipe 25 mm 100 mm long - 1 piece.
- PVC washer 25mm inner diameter. 50 mm outside dia. - 2 Nos.
- PVC adhesive tape - as reqd.
- Super-enamelled copper wire 22 SWG - 50m.
- 4–way terminal pad - 1 No.
- T W plank 150 mm x 300 mm - 1 No.
- Soft iron piece 22 mm dia 75 mm long with hook on one end - 1 No.
- SPST Knife switch 16A - 1 No.
- Adhesive paste for fixing washers - as reqd.
- PVC/Empire sleeve 2 mm - as reqd.

PROCEDURE

TASK 1: **Make the solenoid and determine its polarity for the given direction of current**

1 Fix the PVC washers at both ends of the PVC pipe to make the bobbin. (Fig 1)

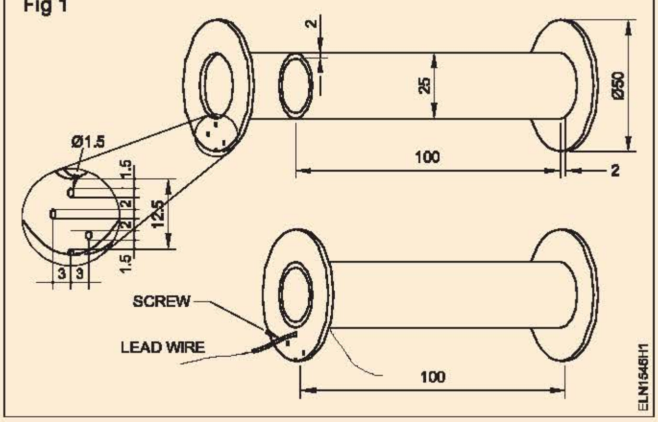
2 Fix the bobbin suitably in a hand drilling machine.

3 Secure the lead-out wire to the bobbin by means of an adhesive tape after inserting the lead wire with sleeve through the hole in the side wall of the bobbin.

4 Find the number of turns wound over the bobbin for one rotation of the drilling machine handle.

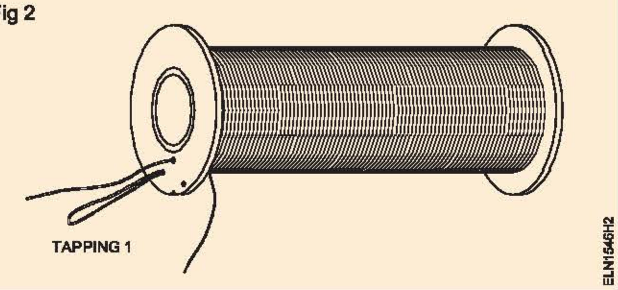
5 Calculate the number of handle rotations required for winding 200, 400 and 600 turns.

Fig 1



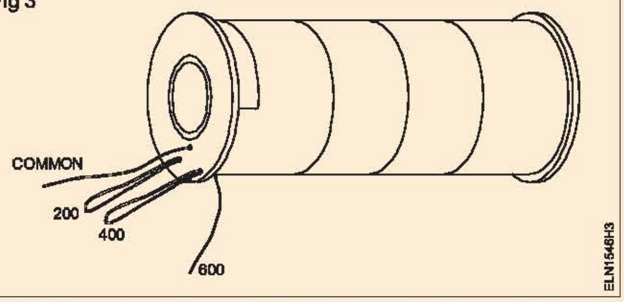
6 Complete the windings by taking tapping at an interval of every 200 turns (200, 400 and 600) such that the common and three terminals are taken out through the holes provided in the side wall (PVC washer). (Fig 2)

Fig 2



7 Insulate the top layer with an adhesive insulation tape. (Fig 3)

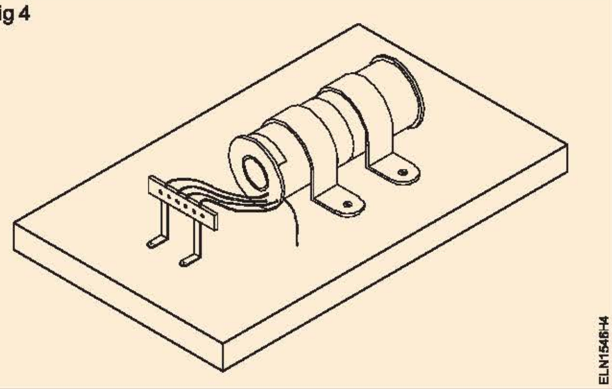
Fig 3



8 Fix the solenoid on a 150 mm x 300 mm wooden board using a plastic saddle. (Fig 4)

9 Connect the drawn out ends with sleeves to the 4-way terminal pad, fixed on the board. (Fig 4)

Fig 4

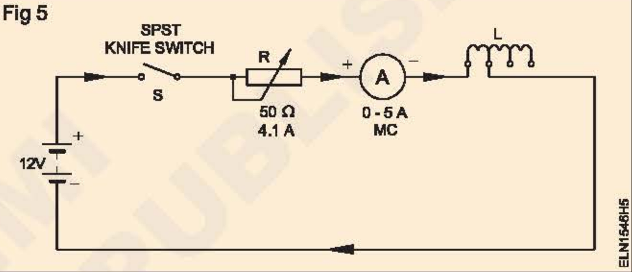


Carefully remove the enamel insulation without damaging the conductor.

10 Check the continuity with an Ohmmeter.

11 Connect the ends of the solenoid to the 12V battery through switch S, variable rheostat and ammeter 0 - 10A. (Fig 5)

Fig 5



12 Close the switch S and test the solenoid with a bar.

— — — — — —

TASK 2: **Determine the magnetic effect of electric current**

1 Vertically mount the coil on a stand.

2 Suspend the spring balance from the stand and hook it vertically to the (plunger) soft iron piece. (Fig 6)

Check for the free movement of the plunger inside the solenoid.

3 Take the initial reading of the spring balance.

4 Connect the solenoid to the first tapping, say 200 turns, through an ammeter, knife switch and rheostat as shown in Fig 5. Get the circuit checked by the instructor.

5 Close the switch and adjust the current to 5 amperes.

6 Note the reading of the ammeter and spring balance and record in Table 1.

7 Open the switch.

8 Repeat operations 4 to 7 for tappings 400 and 600 by keeping the current constant at 5A, adjusting the rheostat.

9 Calculate the pulling power for strength in all the 3 cases.

10 Ascertain the relationship between the number of turns and magnetic strength when the solenoid carries the same current, and record the conclusion accordingly.

11 Connect the coil to 600 turns tappings.

12 Close the switch.

13 Keep the current at 1 ampere by adjusting the rheostat. (Fig 6)

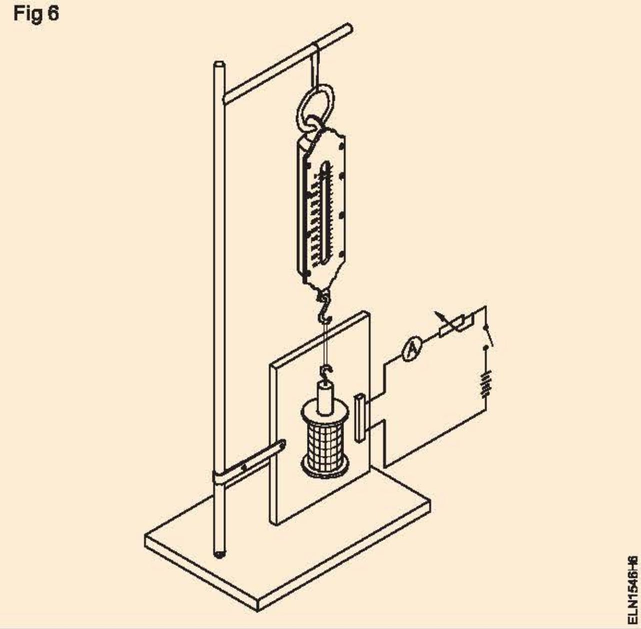
14 Note and record the spring balance readings in Table 2.

15 Repeat step 14 for different current values (in steps of 1 ampere up to 5 amperes).

16 Calculate the pulling power for strength in all the 5 cases.

17 Ascertain the relationship between the current and the magnetic strength when the number of turns of the solenoid is constant. Record the conclusion accordingly.

Fig 6



18 Get it checked by the instructor.

Conclusion

____

____

____

Table 1

Magnetic strength with respect to the number of turns (Current kept constant)

Sl.No.	No.of turns	Current	Initial reading of balance W1	Spring balance reading W2	Strength of pulling power (W3 = W2 - W1)
1	200	5 amps			
2	400	5 amps			
3	600	5 amps			

Table 2

Magnetic strength with respect to the current

(Turns kept constant = 600 turns)

Sl.No.	Current	Initial reading of the balance W1	Spring balance reading W2	Strength of pulling power (W3 = W2 - W1)
1	1 amp			
2	2 amps			
3	3 amps			
4	4 amps			
5	5 amps			

— — — — — —

Determine direction of induced E.M.F and current

Objectives: At the end of this exercise you shall be able to
- **determine the direction of e.m.f induced in the circuit**
- **determine the direction of the current by the induced e.m.f.**

Requirements

Tools/Equipment

- Voltmeter (100 mv - 0 - 100 mv) - 1 No.
- Bar magnet 4” - 1 No.
- Solenoid (Assembled) fitted on board (prepared in previous exercise) - 1 No.
- Multimeter - 1 No.
- Magnetic compass - 1 No.

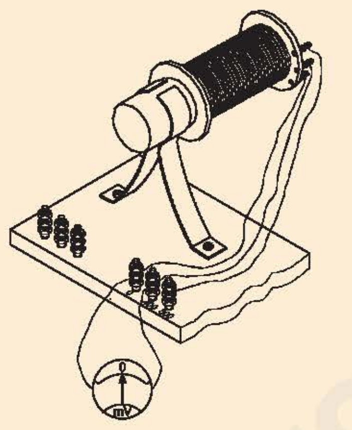
Materials

- Connecting leads - as required.
- PVC transparent sheet with drilled holes (4” x 3”) - 1 No.

PROCEDURE

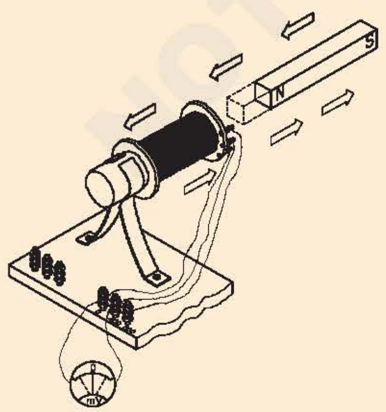
1 Connect the centre zero voltmeter to the solenoid and test the continuity of the coil as shown in Fig 1.

Fig 1



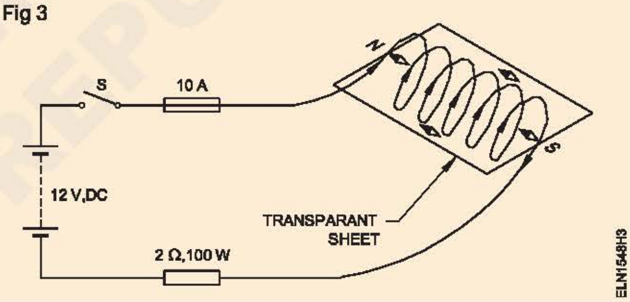
2 Check whether the induced voltage is present in the coil by mounting bar magnet as shown in Fig 2.

Fig 2



3 Extend one end of the coil wire and make 10 turns at equal distance in a drilled hole made on a transparent sheet on it as shown in Fig 3.

Fig 3



4 Place the compass at one entry point of the conductor by pointing ‘N’ to the entry of the coil as shown in Fig 3. Record your findings in Table 1.

5 Insert the magnet into the coil and move the magnet to and fro as in the earlier exercise. Note the deflection in the compass needle.

6 Change the polarity of the magnet and repeat step 4. Note the deflection in the compass needle.

The current direction shown in Fig 4 is for your reference.

The direction of the current in a conductor’s cross-section is shown by the (+) plus symbol inside a conductor or a (.) dot symbol outside a conductor. (Fig 4)

7 Interpret your findings and record the conclusion in Table 2. (A sample result is given for reference)

Fig 4

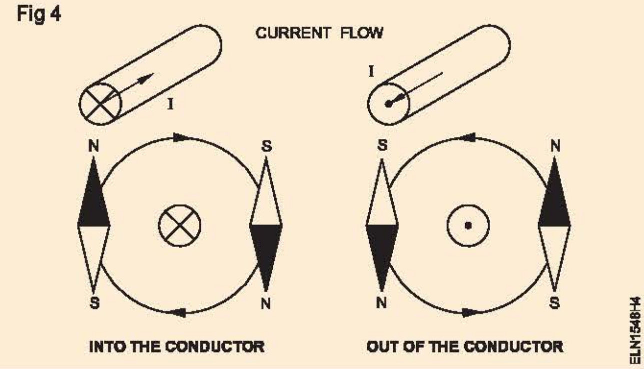
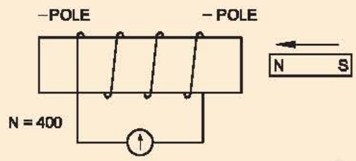
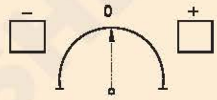
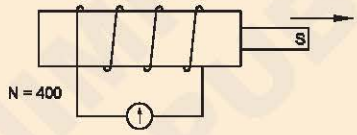
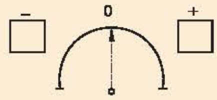
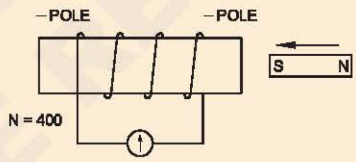
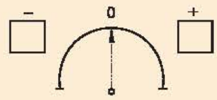
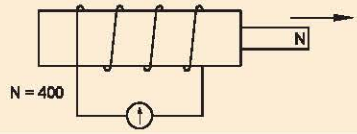
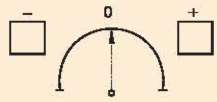


Table 1

Sl. No.	Compass N towards entry	Compass S towards entry
1		
2		
3		

Table 2

(POLARITY OF INDUCED EMF)

Case	Operation	Figure	Polarity of induced voltage
1.	Magnet is moved inside the coil		
2.	Magnet is moving away from the coil		
3.	Magnet with changed polarity is moved inside the coil		
4.	Magnet with changed polarity is moving away from the coil		

Practice on generation of mutually induced E.M.F

Objectives: At the end of this exercise, you shall be able to
- **prepare a solenoid having two sets of winding**
- **wind the solenoid with both primary and secondary windings**
- **measure the induced voltage in the secondary wrinding.**

Requirement

Tools/Equipments

- Voltmeter (100 MV - 0 - 100 MV) - 1 No.
- Bar magnet 100 mm - 1 No.
- Solenoid (Assembled) fitted on board (prepared in previous exercise) - 1 No.
- Multimeter - 1 No.
- Magnetic compass - 1 No.

Materials

- Connecting wires - as reqd.
- PVC transparent sheet with drilled holes 100 x75 mm - 1 No.
- Super Enamelled copper wire 22 SWG - 25 m
- Supporting stand - 1 Pair.

PROCEDURE

Use the solenoid, used in exercise 1.4.39 and 1.4.40.

1 Take the two ends of the coil, solenoid and check its continuity.
2 Wrap the tape over the solenoid.
3 Wind the copper wire (22 SWG) over the solenoid from one end to the half the length of the coil and wrap it with the tape.
4 Take the two terminals of the copper wire and check its continuity.
5 Fix the solenoid, which already has two windings in the board using clamps and screws as shown in Fig 1.
6 Connect 0 -10V MI voltmeter between two ends of copper wire.
7 Apply AC 10V to the solenoid (primary) and measure voltage between two ends of copper wire as shown in Fig 1.
8 Note down the reading of the voltmeter in table 1.
9 Insert the soft iron core into the solenoid. Now the voltage will increase. Note down the voltage in Table 1.
10 Switch OFF and insert a non-magnetic cylindrical core inside the coil. Switch ON the 10V supply. Note down the voltage in Table 1.
11 Switch OFF and tabulate all the readings.
12 Get the work approved by the instructor.
13 Note down the result and conclusions.

Fig 1

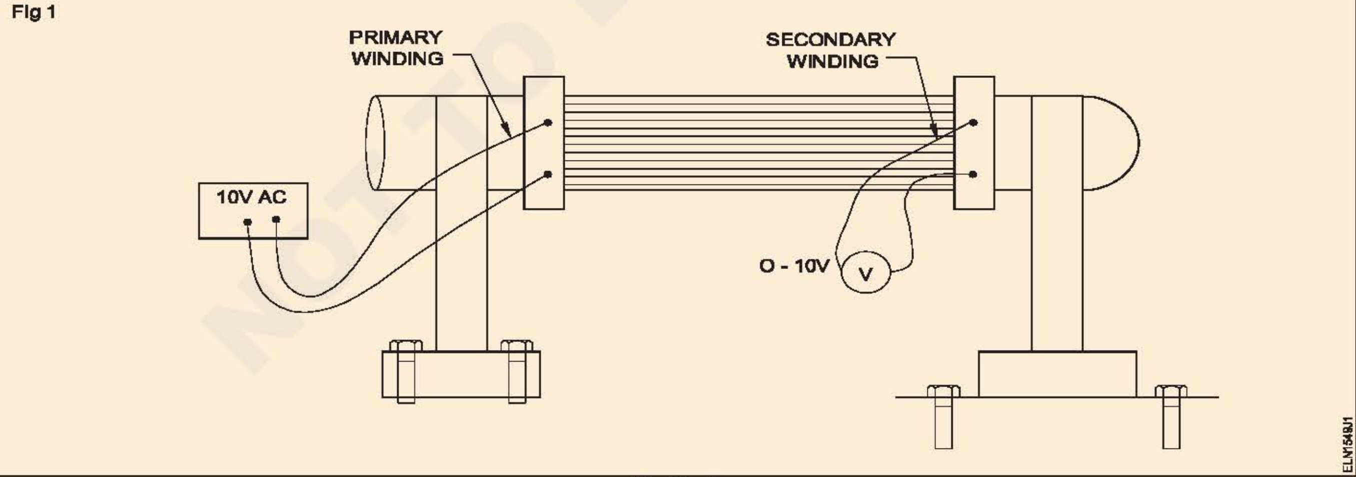


Table 1

Primary Turn (Solenoid)	Secondary Turn (Copper wire)	Without soft iron core		With soft iron core		Any other core	
		Primary Voltage	Secondary Voltage	Primary Voltage	Secondary Voltage	Primary	Secondary
		10		10		10	

Measure the resistance, impedance and determine the inductance of choke coils in different combinations

Objectives: At the end of this exercise, you shall be able to
- **measure the resistance of the coil**
- **measure the impedance in AC circuit using the voltmeter and ammeter**
- **determine the inductance of the coil.**

Requirements

Tools/Instruments

- MC Voltmeter 0-15V - 1 No.
- MI Voltmeter 0-300V - 1 No.
- MC Ammeter 0-500mA - 1 No.
- MI Ammeter 0 500mA - 1 No.
- Ohmmeter 0 - 2 K ohms - 1 No.

Equipment/Machines

- Potential divider 480 ohms 1A - 1 No.
- 12 volts DC source (RPS)
- 240 volts AC source

Materials

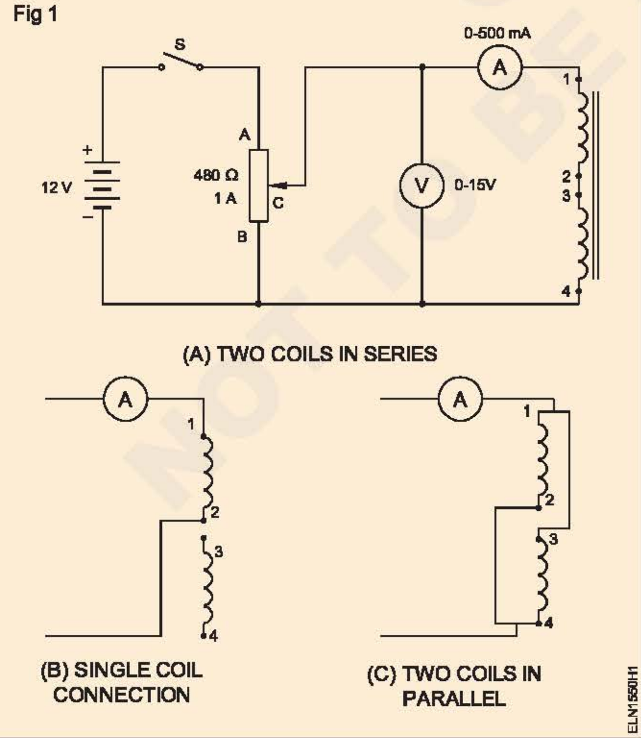
- SPT switch 6A 250V - 1 No.
- Connecting leads - 7 Nos.
- Wound choke (Solenoid coil) - 2 Nos.
- Tube light choke 40W, 240V - 2 Nos.

PROCEDURE

TASK 1: **Measure the resistance of the coil**

1 Connect the elements and form a circuit as shown in Fig 1.

Fig 1



Keep terminal `C' at `B' in the potentiometer/ voltage divider for minimum output voltage

2 Show the connections to the instructor and get it approved.

3 Close the switch `S' and adjust the potentiometer for 100mA current. Record the value of I and V in Table 1.

4 Adjust the potentiometer to obtain the current, 200 and 300mA. Record I and the corresponding voltages.

5 Calculate the resistance of the coil applying Ohm's Law. Record the result in Table 1. Find the average value of resistance in ohms ie. R = V/I

6 Disconnect one coil i.e. terminals 3 and 4. Repeat the experiment to get the resistance measured for single coil with terminals 1 and 2. (Fig 1b)

7 Connect terminal 3 at 1 and 4 at 2. Read and record the V and I in Table 1. (Fig 1c)

8 **Result:** Resistance of the 2 choke coils in series = ... ohm

Resistance of one choke coil = ... ohm

Resistance of two coils chokes in parallel = ... ohm

....

9 Verify the above results with the help of an ohmmeter.

Table 1

Sl.No.	DC voltatge across coils	current in mA	Resistance R = V/I	Coils connected
1				Two in series
2				One coil only
3				Two in parallel

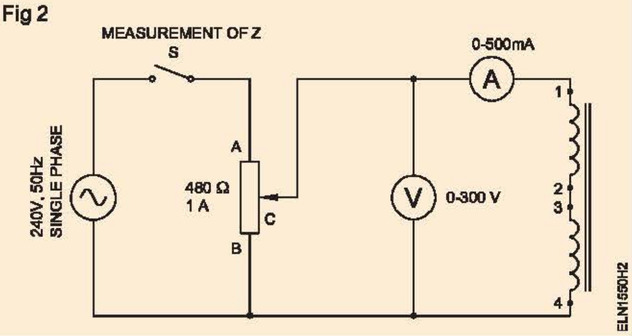
Average resistance of both coils = ______________ ohms
Average resistance of the single coil = ______________ ohms
Average resistance of the parallel coils = ______________ ohms

— — — — — —

TASK 2: **Measure the impedance of the coil in AC supply**

1 Replace the voltmeter and ammeter with MI of type 0-300V and 0.5 ampere respectively. Connect the circuit to AC 240V 50 Hz supply source as shown in Fig 2.

Fig 2



Keep the terminal of the potentiometer `C' at `B' for the minimum output voltage.

2 Show the connections to the instructor and get his approval.

3 Close the switch `S' and adjust the potentiometer to obtain a current of 100mA. Record the I and V in Table 2.

4 Adjust the potentiometer for a current of 200mA. Record the corresponding voltage. Repeat it for 300mA.

5 Calculate the value of R = V/I for each case. Record the value under the column ` impedance ' and find the average value of impedance ___________ ohm

6 Disconnect one coil (i.e. terminals 3 and 4). Repeat steps 2 to 4 to determine impedance of one coil.

Conclusion

i) When both coils are in series the impedance is

____

____

ii) Impedance of one coil is ________________ ohms.

— — — — — —

TASK 3: **Determine the inductance of the choke**

Calculate the inductance (L) in the method shown below:

Average value of resistance (R) of the choke from Table 1 = _________________ ohms.

Average value of impedance (Z) of the choke from Table 2 = _________________ ohms.

$X_L = 2\pi fL$

$L = \frac{X_L}{2\pi f}$

where π = 3.142 (22/7)

f = Frequency of supply in Hz

L = Inductance in Henry

Inductance of the choke coil is $L = \frac{X_L}{2\pi f}$ Henry (H)

L = _________ Henry

— — — — — —

Table 2

Sl.No.	AC voltage across coils	AC current in mA	Impedance Z = V/I	Coils connected
1				Two in series
2				
3				One coil only
4				

Average value of impedance of both coils = ______________ ohms
Average value of impedance of single coil = ______________ ohms

Identify various types of capacitors, charging/discharging and testing

Objectives: At the end of this exercise, you shall be able to
- **identify the type of capacitor by visual inspection**
- **identify the capacitor's value and rating from the marking**
- **test the capacitor with DC supply for insulation and leakage**
- **test the capacitor for charge and discharge.**

Requirements

Tools/Instruments

- Ohmmeter (multimeter - ohms range) - 1 No.
- MC Voltmeter (0 - 15V) - 1 No.
- MC Ammeter (100mA - 0 - 100mA) - 1 No.

Equipment/Machines

- DC source 12 V or 0-30V variable (R.P.S) - 1 No.

Materials

- Capacitors - paper, mica, electrolytic, mylar, tantalum, variable air core and mica – assorted values and different voltage ratings - as required.
- Potentrometer 100 k ohm - 1 No.
- Single pole, double throw switch 16A 250V - 1 No.

PROCEDURE

TASK 1: **Identification of capacitors**

1 Look at Figs 1(a) to 1(t). Identify the capacitors and read the value of capacitance and working voltage from the markings, if indicated, and record in Table 1.

2 From the capacitor provided by the instructor read the value of the capacitor and identify its type.

Fig 1

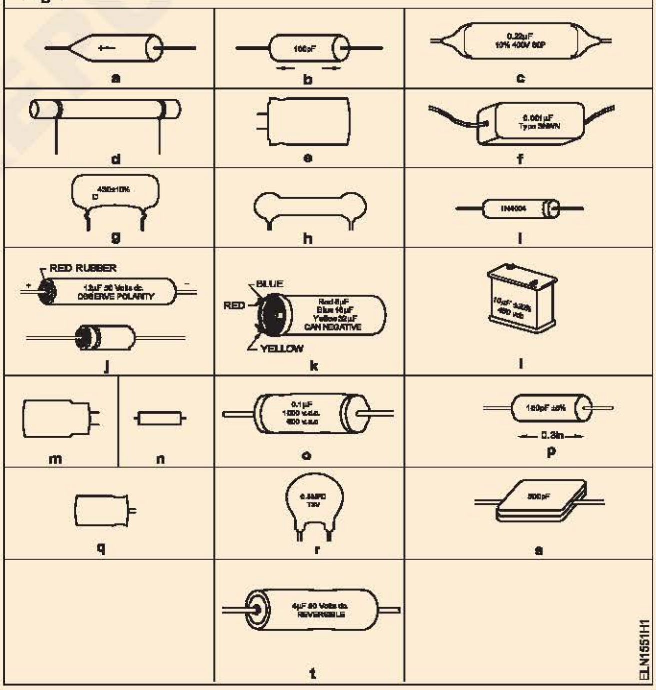


Table 1

Fig.No.	Name of component	Symbol	Type	Capacitance value	Voltage rating

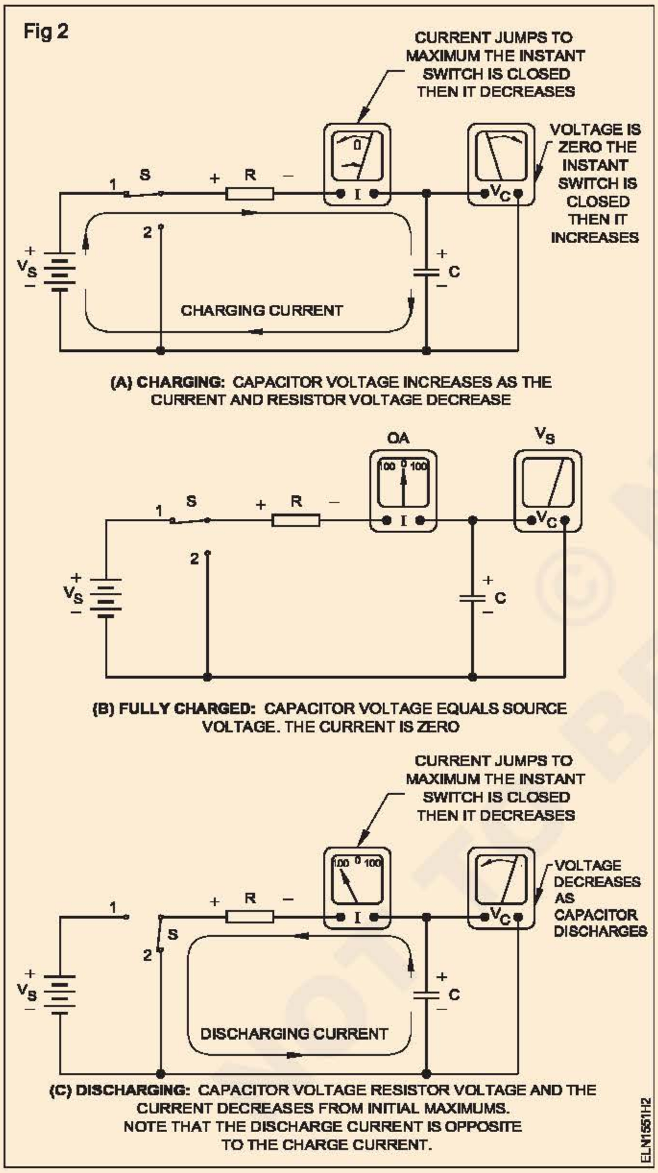
TASK 2: **Test the capacitor for charging and discharging**

1 Initially touch both leads of the capacitor with the voltmeter (suitable range).

> **If there is any deflection, contact both leads through a resistance for sufficiently a long time.**
>
> **Do not touch the capacitor leads by hand. High voltage retained by a charged capacitor will give a severe shock.**

2 Form the 12V circuit for testing the capacitor circuit elements as shown in Fig 2. Keep the switches open.

Fig 2



(A) CHARGING: CAPACITOR VOLTAGE INCREASES AS THE CURRENT AND RESISTOR VOLTAGE DECREASE

(B) FULLY CHARGED: CAPACITOR VOLTAGE EQUALS SOURCE VOLTAGE. THE CURRENT IS ZERO

(C) DISCHARGING: CAPACITOR VOLTAGE RESISTOR VOLTAGE AND THE CURRENT DECREASES FROM INITIAL MAXIMUMS. NOTE THAT THE DISCHARGE CURRENT IS OPPOSITE TO THE CHARGE CURRENT.

3 Keep the switch S connected to the battery. Observe the deflection in the ammeter and voltmeter.

4 Record the deflection in the ammeter when the switch S is closed to position 1.

5 Observe the voltmeter reading at equal intervals of time. (At least 4 readings from zero to the maximum deflection.)

6 Record the time and voltage in Table 2.

7 Repeat steps 1 to 5 by changing the value of the series resistor 'R' (increasing the value of R increases the time).

8 Open the switch 'S' and observe the voltmeter reading for 5 minutes.

9 Result

The voltage across the capacitor remains __________ because of ______________ condition of the capacitor.

10 Close the switch S to position 2 and observe the voltmeter and ammeter readings.

11 Observe the deflection of the voltmeter:

(a) The voltage of the capacitor gradually decreases.

(b The current shoots to maximum at the instant switch S is closed to position 2, then it decreases gradually, indicating that the capacitor is losing charge.

12 Repeat the test for different values of capacitance rated for different voltages.

> **The testing voltage should be close to the voltage rating of the capacitor.**

Table 2

Sl. No.	Value of		Time in seconds	Voltage volts
	Capacitor µF	Resistor kW		
1	470	500		
2				
3				
4				
5	4370			
6				
7				
8				
9	470			
10				
11				
12				

TASK 3: **Testing of capacitor with ohmmeter**

1 Discharge the given capacitor.

2 Connect the ohmmeter to test the capacitor (Fig 3) and observe the deflection in the meter.

> **Set the ohmmeter selector switch at a higher range.**
>
> **While testing with a polarised capacitor, the positive terminal of the capacitor is to be connected to the positive terminal of the ohmmeter and the negative terminal to the negative terminal of the ohmmeter.**
>
> **While testing with non-polarised capacitor (mica, ceramic, etc) the low values in fractions of micro-farad will not show any deflection in the ohmmeter.**

Table 3

Sl. No.	Value of Capacitor	Meter reading	Result
1			
2			
3			
4			
5			

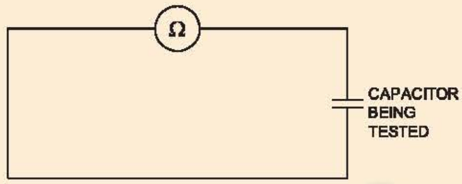
For electrolytic capacitor only.

3 Assess the condition of the capacitor under test, using the information available in Fig 3 and record the findings in Table 3.

4 Discharge the capacitor.

5 Perform the test in different capacitors.

Fig 3



INDICATION OF TEST INSTRUMENT	CONDITION OF CAPACITOR UNDER TEST
METER INDICATES SOME RESISTANCE	LEAKAGE
NO DEFLECTION	OPEN
DEFLECTS AND RETURN BACK SLOWLY	GOOD CONDITION
CONTINUOUSLY SHOWS ZERO READING	SHORT

TESTING OF CAPACITOR WITH OHMMETER

ELN1551H3

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Group the given capacitors to get the required capacity and voltage rating

Objectives: At the end of this exercise you shall be able to
- **determine the capacitive reactance**
- **select capacitors and connect in series**
- **select capacitors and connect in parallel**
- **test combinations of capacitors.**

Requirements

Tools/Instruments

- MI Voltmeter 0 to 300V - 1 No.
- MI Ammeter 0 to 500mA - 1 No.
- Rheostat, about 300 ohms 2A - 1 No.

Equipment/Machines

- 240V AC source.

Materials

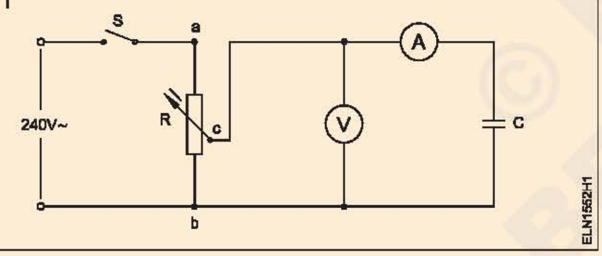
- Switch SPT 6A 250V - 1 No.
- 2 MFD 240V/400V - 2 Nos.
- 4 MFD 240V/400V - 1 No.
- 8 MFD 240V/400V 50 Hz. - 1 No.
- Connecting leads - as required.

PROCEDURE

TASK 1: **Measure capacitive reactance (Xc)**

1 Form the circuit as shown in Fig 1 with a 2 - μF capacitor. (Fig 1)

Fig 1



Discharge the capacitor before handling.

2 Close the switch S and adjust the potential divider for the rated voltage of the capacitor (240 V).

3 Note the voltmeter and ammeter readings and record in Table 1.

4 Calculate the reactance $X_C = \frac{V}{I}$ and record the result in Table 1

Table 1

Sl.No.	Value of Capacitor	Voltage	Current	$X_C = \frac{V}{I}$

5 Compare the calculated value using the formula

$$X_C = \frac{1}{2\pi fC}$$

6 Find the capacitive reactance value for 4 μF repeating steps 1 to 5.

7 **Conclusion**

i When capacitance increases the capacitive reactance ____________

ii Increased reactance means ________ capacitance.

— — — — — —

TASK 2: **Connect capacitors in series**

1 Form the circuit with two capacitors in series as shown in Fig 2. (2 MFD, 2 MFD)

2 Determine the X_C value for the series combination performing steps 2 to 5 of TASK 1. Fill X_C values in Table 2 under the appropriate columns.

3 Calculate the total capacitance C_{total} as

$$\frac{1}{C_{total}} = \frac{1}{C_1} + \frac{1}{C_2}$$

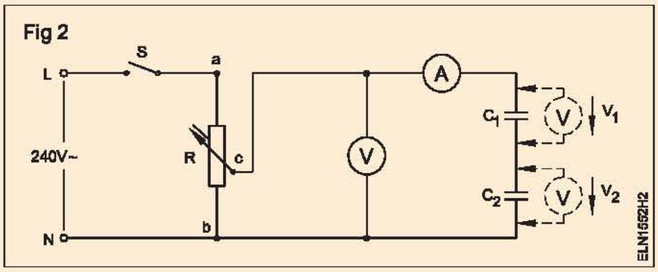


Fig 2

4 Calculate the C_{total} from the X_c. Check for its confirmity.

Result

When capacitors are connected in series

i the total reactance ____________

ii the net capacitance value ____________

5 Measure the voltage across each capacitor and record it in Table 2 under column 3.

6 Repeat steps 1 to 5 for series grouping of capacitors.

a) 2 & 4 MFD b) 4 & 8 MFD

7 Get it checked by the instructor.

Conclusion

The voltage across the capacitor and the value of capacitor in series.

____

____

Table 2

Sl. No.	Value of Capacitor C_1 in μfd	Value of Capacitor C_2 in μfd	Voltage across C_1 V_1	Voltage across C_2 V_2	Current in mA	Voltage V	Total $\frac{1}{C}=\frac{1}{C_1}+\frac{1}{C_2}$	Capacitive reactance $XC=\frac{1}{2\Pi fc}$
1	2	2						
2	2	4						
3	4	8						

— — — — — —

TASK 3: **Connect capacitors in parallel**

1 Form the circuit with two capacitors in parallel as shown in Fig 3 (2 MFD, 2 MFD).

2 Determine the reactance X_C of the parallel combination performing steps 2 to 5 of TASK 1. Fill up X_C in Table 3.

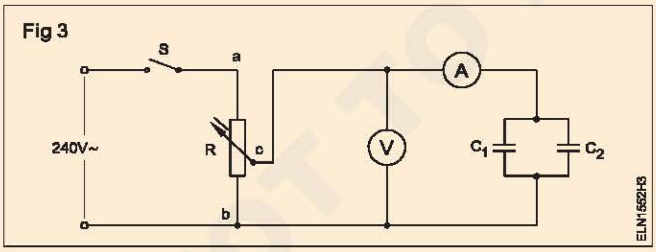


Fig 3

3 Calculate the total capacitance $C_{total} = C_1 + C_2$. Record C_{total} in Table 3.

4 Calculate the C_{total} from X_C. Check for its confirmity.

Result

In parallel combination of capacitance

i the total reactance ____________

ii the total capacitance ____________.

Discharge the capacitors at the end of each experiment / test

5 Repeat steps 1 to 5 for parallel grouping of capacitors.

Table 3

Sl. No.	Value of Capacitor C_1 in mfd	Value of Capacitor C_2 in mfd	Voltage across C_1 V_1	Voltage across C_2 V_2	Current in mA	Voltage V	Total $C_{total}= C_1+C_2$	Total reactance $XC=\frac{1}{2\Pi fc}$
1	2	2						
2	2	4						
3	4	8						

— — — — — —