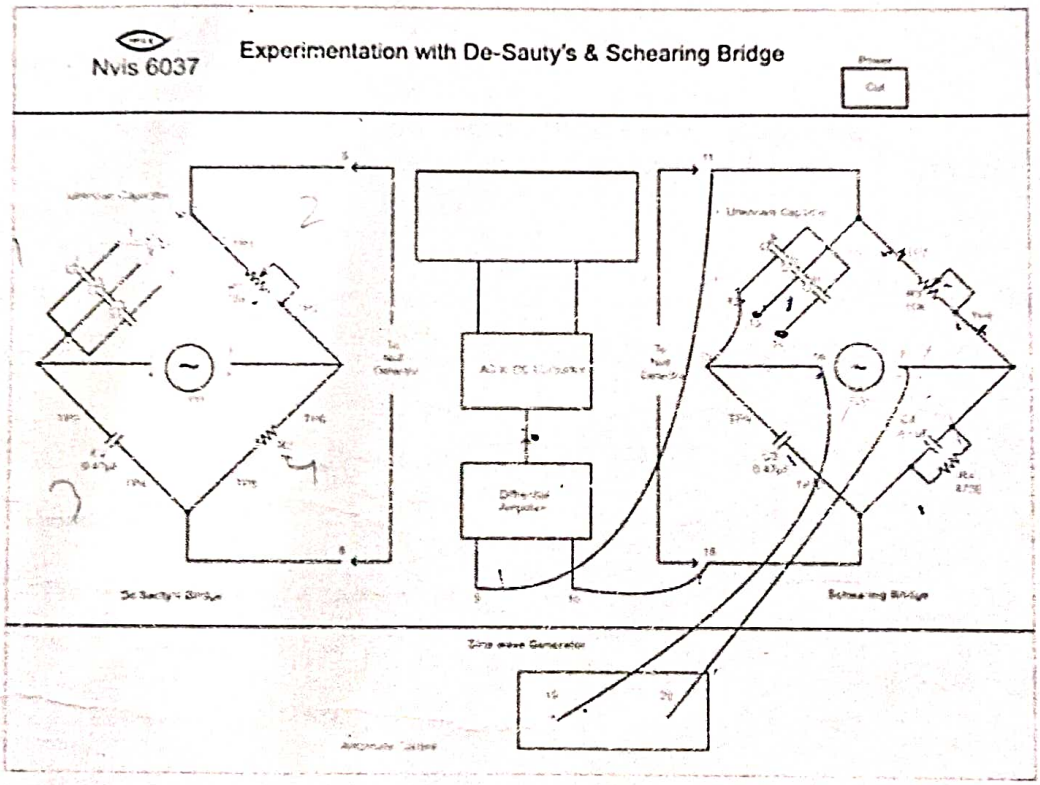
Experiment 2

Objective:

Determination of unknown capacitance using Schearing Bridge method.

Items Required:

1. Schearing Bridge Trainer
2. 2mm Patch cords
3. Multimeter



Procedure:

1. Connect mains cord to the Trainer.
2. Connect terminal 15 to 12 (for evaluating unknown capacitance Cx4).
3. Rotate Variable Resistances towards anticlockwise direction.
4. Connect Null Detector (terminal 9 to 11 and 16 to 18)
5. Connect terminal 19 to 16 and 20 to17.
6. Now switch 'On' the power supply.
7. Set Amplitude Control knob in fully clockwise direction.

8. Now vary the **R3** towards clockwise direction very precisely until the Null Point is detected.

(**Null Point:** It is the point where the voltage is minimum and on rotating **R3** in any direction voltage always increases.)

9. Now remove the patch cord between terminal 12 &15 and record the value of R3 in the observation table using multimeter.
10. Repeat above procedure for different value of unknown capacitors (i.e. Cx5 and Cx6).
11. Tabulate all the retrieved data in observation table below.

Observation Table:

S. No.	Unknown Capacitor	Resistance R3 ohm	Resistance R4 ohm	Capacitor C3 µF
1.	Cx4			
2.	Cx5			
3.	Cx6			

Calculation

1. **For unknown Capacitance CX4:**

$$CX4 = R_4 \times \frac{C_3}{R_3}$$

$= 96580$ µF

0.0989 µf

2. **For unknown Capacitance Cx5:**

$$CX5 = R_4 \times \frac{C_3}{R_3}$$

$= 219580$ µF

0.2157 µf

3. **For unknown Capacitance Cx6:**

$$CX6 = R_4 \times \frac{C_3}{R_3}$$

$= 481500$ µF

0.4815 µf

At balance, $Z_1 \cdot Z_4 = Z_2 \cdot Z_3$.

$$\left(\frac{1}{j\omega C_1}\right)\left(\frac{R_4}{j\omega C_4 R_4}\right) = (R_2)\left(\frac{1}{j\omega C_2}\right)$$

Technical Specifications

Sine Wave Generator		
Frequency	:	1 kHz ± 10%
Amplitude	:	Upto 15 Vpp
Fuse	:	500 mA, slow blow
Mains Supply	:	230 V ±10%, 50 Hz
Unknown Capacitors	:	0.1 µF, 0.22 µF, 0.47µF