1. DESAUTY'S BRIDGE

Objective:

To determine the unknown value of capacitance using Desauty's bridge.

Apparatus:

Software: Lab view software.

Hardware:	Name of the apparatus	Quantity
	Transformer 230/15v	1 No
	Bread board	1 No
	Resistors	5 No
	Variable Resistor	1 No
	Capacitors	1 No
	Digital Multimeter	1 No

Theory:

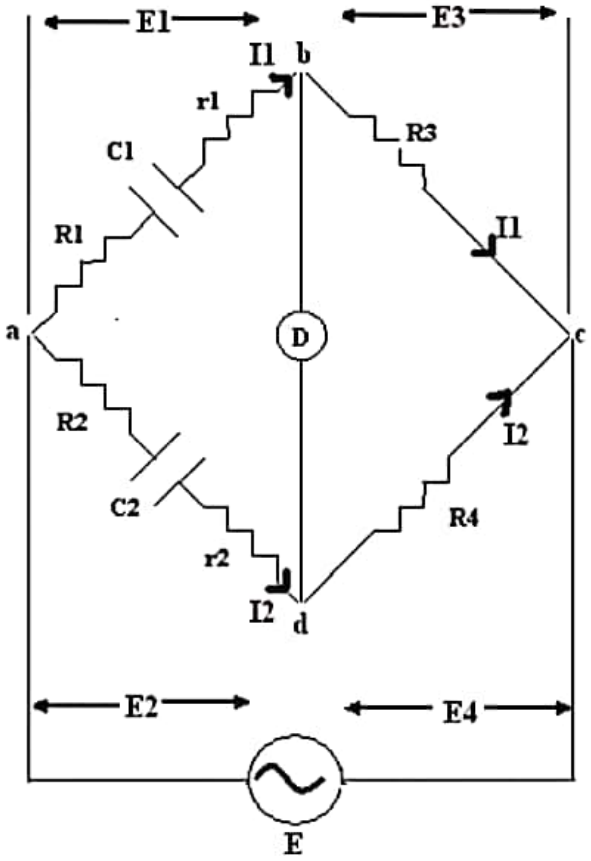
The bridge is the simplest of comparing two capacitances. The connections and the phasor diagram of this bridge are shown below. Let

C_1 = Capacitor whose capacitance is to be measured.

C_2 = A standard capacitor

R_3, R_4 = Non-inductive resistors.

The balance can be obtained by varying either R_3 or R_4. Resistors R_1 and R_2 are connected in series with C_1 and C_2 respectively. r_1 and r_2 are small resistances representing the loss component of the two capacitors.



At balance, $(R_1 + r_1 + 1/j\omega C_1)\, R_4 = (R_2 + r_2 + 1/j\omega C_2)\, R_3$

From which we have $C_1/C_2 = R_4/R_3$. Figure b shows the phasor diagram of the bridge under balance conditions. The angles δ_1 and δ_2 are the phase angles of capacitors $C_1$and C_2 respectively.

Dissipation factor for the capacitors are $D_1 = \tan \delta_1 = \omega C_1 r_1$ and $D_2 = \tan \delta_2 = \omega C_2 r_2$

$$D_2 - D_1 = \omega C_2 (R_1 R_4 / R_3 - R_2)$$

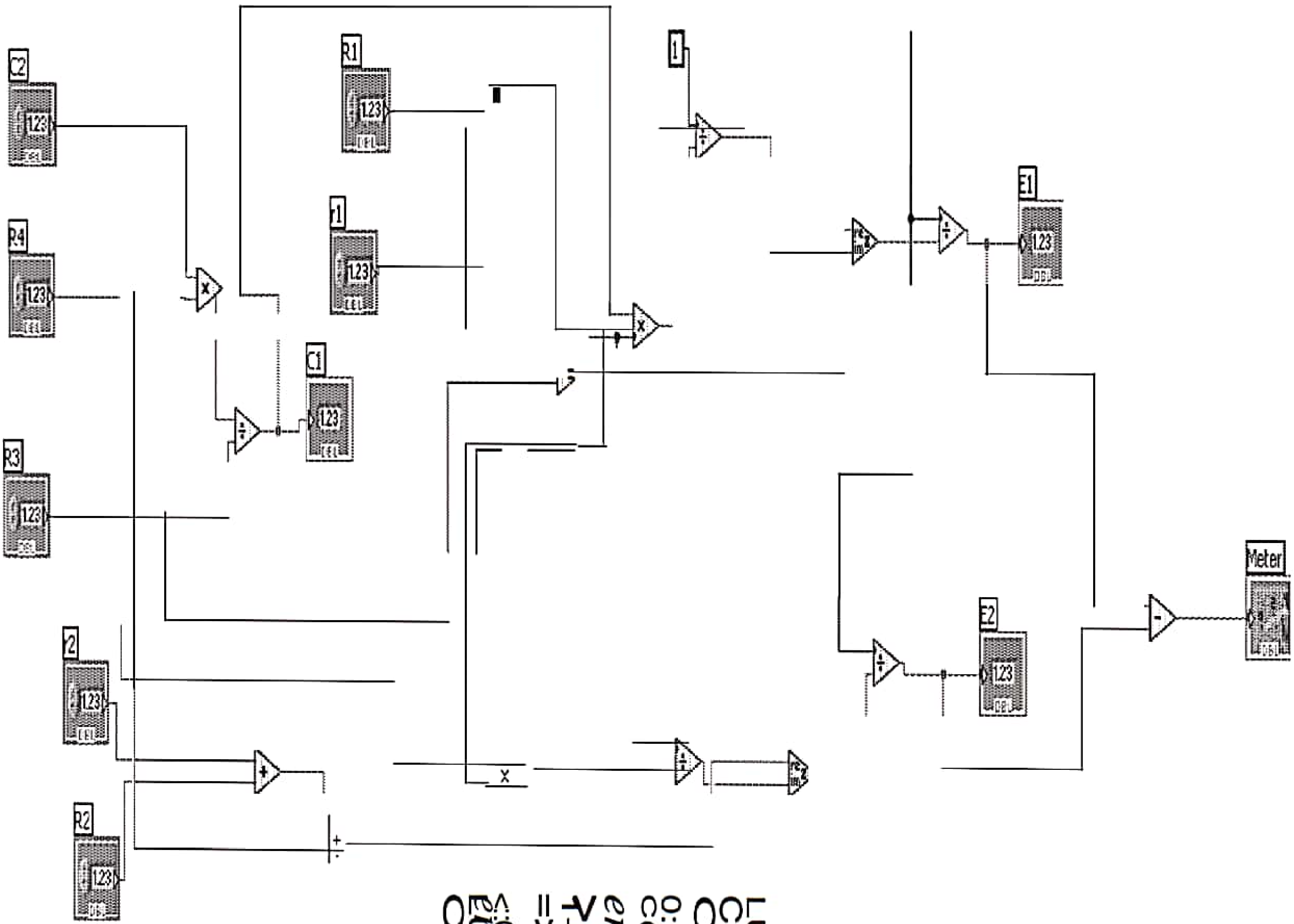
Therefore, if the dissipation factor of one of the capacitors is known, the dissipation factor for the other can be determined.

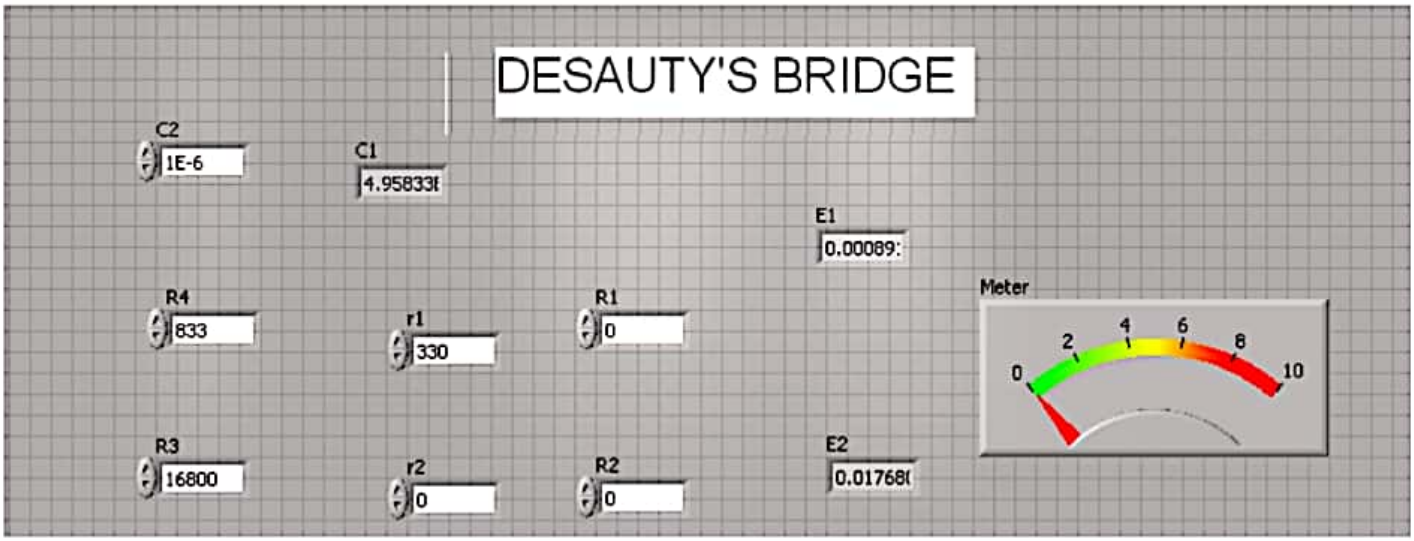
Procedure:

1. Connect the circuit as shown in the figure.
2. Connect the unknown capacitor in C_1.
3. Select any value of R_3.
4. Connect the multimeter between ground and output of imbalance amplifier.
5. Vary R_2, from minimum position, in clockwise direction.
6. If the selection of R_3 is correct the balance point can be obtained at minimum position.
7. If that is not the case, select another R_3.
8. Since, the unknown capacitance whose resistive effect would be made for capacitive form and R_2 is adjusted for minimum output.

Observation:

S.NO	R_3	R_2	C_2	$C_1 = R_2C_2/R_3$	True value of C_1





Result:

The unknown capacitance is determined using the Desauty's bridge.