De Sauty's bridge

<u>Aim</u>: To compare the capacities of two condensers (or) to find the capacitance of the given condenser, by using De Sauty's bridge.

<u>Apparatus</u>: Two condensers, two resistance boxes or two resistance pots of 10 KHz, Signal generator, head phone and well insulated connecting wires.

Formula :- Capacity of a unknown capacitor $C_2 = \frac{R_1}{R_2} x C_1 \mu F$

Where C_1 is the capacity of the known capacitor.

 R_1 and R_2 are the variable non- inductive resistors.

Description: The De Sauty's bridge is an A.C Bridge works on the principle of Wheat stone's bridge. This bridge is used to determine the capacity of an unknown capacitor C_2 in terms of the capacity of a standard known capacitor C_1 . Here R_1 and R_2 are non-inductive resistors. R_1 , R_2 , C_1 and C_2 are connected in a Wheat stone's bridge as shown in the figure-1. When the bridge is balanced, the ratios of impedances are equal as given below.

$$\frac{Z_1}{Z_2} = \frac{Z_3}{Z_4}$$

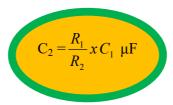
$$\frac{1}{\frac{j\omega C_1}{R_1}} = \frac{1}{\frac{j\omega C_2}{R_2}}$$

$$\frac{C_2}{C_1} = \frac{R_1}{R_2}$$

Procedure: The connections are made as shown in the figure. The resistance R_1 and a condenser C_1 are in series in one branch of the bridge and a resistance R_2 and another capacitor C_2 are in series in another branch. The A.C signal generator frequency is adjusted to a fixed value of 1 KHz or below, which is convenient to our ear.

A resistance is unplugged in R_1 and the resistance R_2 is adjusted till the sound in the head - phone is reduced to zero level . The value of R_2 is measured with a multi-meter and noted. While measuring the resistances, they should be in open circuit. The above process is repeated for different values of R_1 and the values are noted in the table .

When the hum in the head – phone is at zero level, then the time constants of the upper and the lower braches of Wheat stone's bridge equal i.e. $C_1R_1=C_2R_2$.



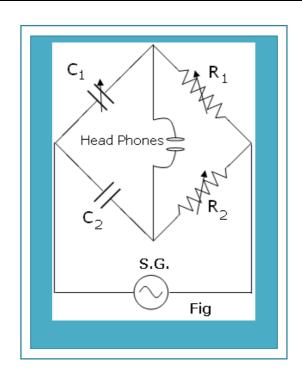
<u>Precautions</u>:- 1) The connecting wires should not be in contact with the experiment table.

2) The wires are checked up for continuity.

Result :-			

Table

S.No.	Capacity of	Resistance	Resistance	Capacity of	Standard
	known condenser	$R_1 \Omega$	$R_2 \Omega$	unknown condenser	Value of
	C_1 μ F			$C_2 = \frac{R_1}{R_2} X C_1 \mu F$	C ₂ μF
1.					
2.					
3.					
4.					
5.					
6.					



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