Anderson's bridge

Aim : - To measure the self - inductance of a given coil by Anderson's bridge method.

Apparatus :- Inductor, standard capacitor, resistors (fixed resistances and variable pots as given in the circuit) signal generator, head phones and connecting terminals.

Formula :- Inductance of given coil $L = C [(R_1 + R_2) R_5 + R_2 R_4]$ mH

Where C = Capacity of the standard capacitor (μ F)

R_2, R_3, R_4 = Known, fixed and non – inductive resistances ($K\Omega$)

R_1, R_5 = Variable resistances ($K\Omega$)

Description :- Anderson's bridge is the most accurate bridge used for the measurement of self – inductance over a wide range of values, from a few micro-Henries to several Henries. In this method the unknown self-inductance is measured in terms of known capacitance and resistances, by comparison. It is a modification of Maxwell's L - C bridge. In this bridge, double balance is obtained by the variation of resistances only, the value of capacitance being fixed.

Procedure :-The circuit diagram of the bridge is as shown in the figure. The coil whose self-inductance is to be determined, is connected in the arm AB, in series with a variable non-inductive resistor R_1. Arms BC, CD and DA contain fixed and non – inductive resistors R_2, R_3 and R_4 respectively. Another non - inductive resistor R_5 is connected in series with a standard capacitor C and this combination is put in parallel with the arm CD. The head - phones are connected between B and E. The signal generator is connected between A and C junctions.

Select one capacitor and one inductor and connect them in appropriate places using patch chords. The signal generator frequency is adjusted to audible range. A perfect

balance is obtained by adjusting R_1 and R_5 alternatively till the head – phones indicate a minimum sound. The values of R_1 and R_5 are measured with a multi-meter(While measuring the R_1 and R_5 values, they should be in open circuit).In the balance condition the self – inductance value of the coil is calculated by using the above formula. The experiment is repeated with different values of C.

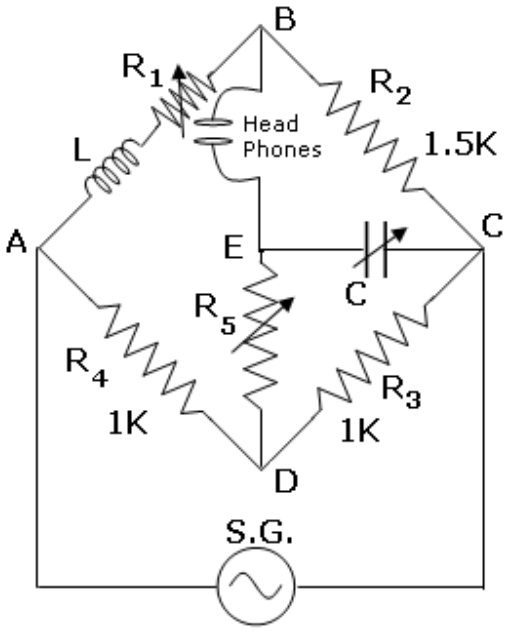
Precautions : - 1) The product (CR_2R_4) must always be less than L .

2) R_1 and R_5 are adjusted until a minimum sound is heard in head – phones.

Result :-

Table

S.No.	Capacity (C) μ F	Resistance (R_1) Ω	Resistance (R_5) Ω	Calculated value (L) $C [(R_1 + R_2) R_5 + R_2 R_4]$ mH	Standard value of L mH
1.					
2.					
3.					
4.					
5.					
6.					



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