

Indian Institute of Information Technology, Allahabad
Department of Electronics and Communication Engineering

Course Name: Electronics Measurement and Instrumentation

EXPERIMENT NO: 01

Objective: To study the AC Bridge, verify the balancing condition and find out unknown resistance.

Materials Required:

Bread Board, Resistors, Capacitors, Variable inductor, Power supply, Connecting wires.

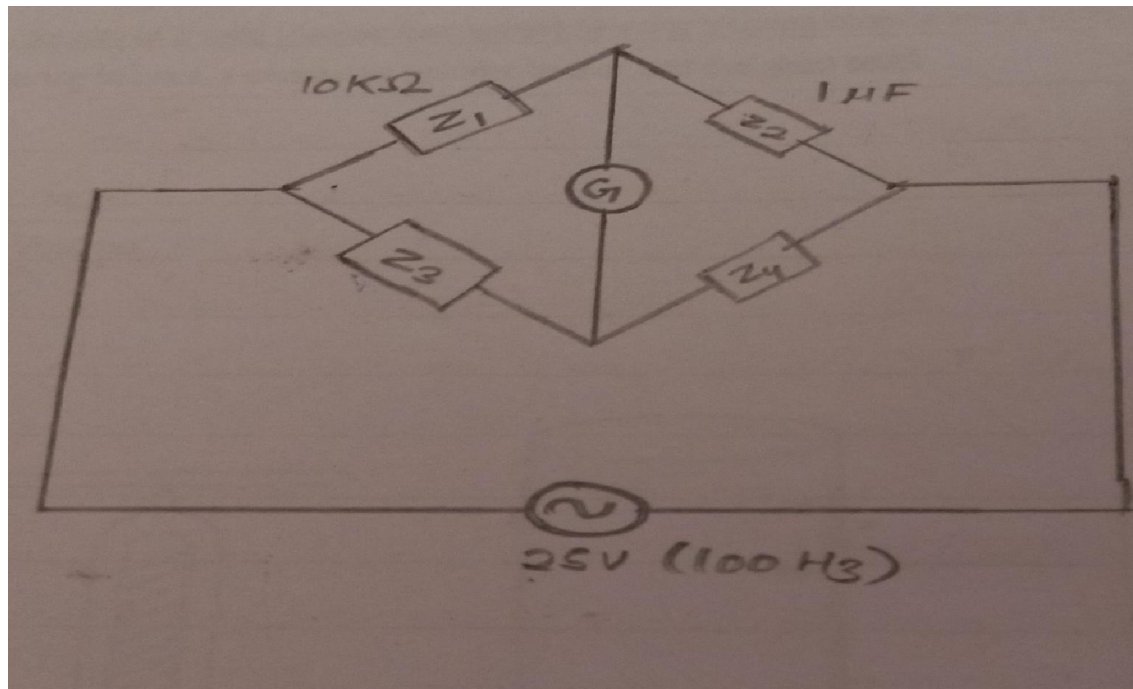
Theory:

A bridge circuit is used to measure the value of unknown resistance, inductance and capacitance is known in the bridge. The AC bridges are very convenient and give the accurate result of the experiment. The bridge has four arms, one AC supply source and one balance detector. It works on the principle that the balance ratio of the impedance will give the balanced condition to the circuit which is determined by null detector.

$$|Z_1| |Z_4| = |Z_2| |Z_3|$$

And phase condition: $\angle\theta_1 + \angle\theta_4 = \angle\theta_2 + \angle\theta_3$.

Circuit Diagram:



Circuit diagram of AC Bridge

Observation tables :

S.No.	Inductance (Theoretical) (mH)	Inductance (Practical) (mH)	Resistance (Theoretical) (ohm)	Resistance (Practical) (ohm)
1	40	40.7	4	4.8
2	60	60.35	6	6.1
3	80	81.1	8	9.5

Calculation :

Percentage error in resistance : $E_1 = 4.8 - 4/4 \times 100 = 12\%$

$$E_2 = 6.1 - 6/6 \times 100 = 1.67\%$$

$$E_3 = 9.5 - 8/8 \times 100 = 18.75\%$$

Results: We have successfully verified the balancing condition and found the unknown resistance.

Precautions:

- (a) Connections should be verified before clicking run button.
- (b) Check the components before use.
- (c) The resistance to be chosen should be in K ohm range.