II) Once again for unfiltered readings probes were connected across resistors and waveforms from CRO were traced along with the values.

III) For filter, capacitor was connected in parallel to resistor and output was taken and traced.

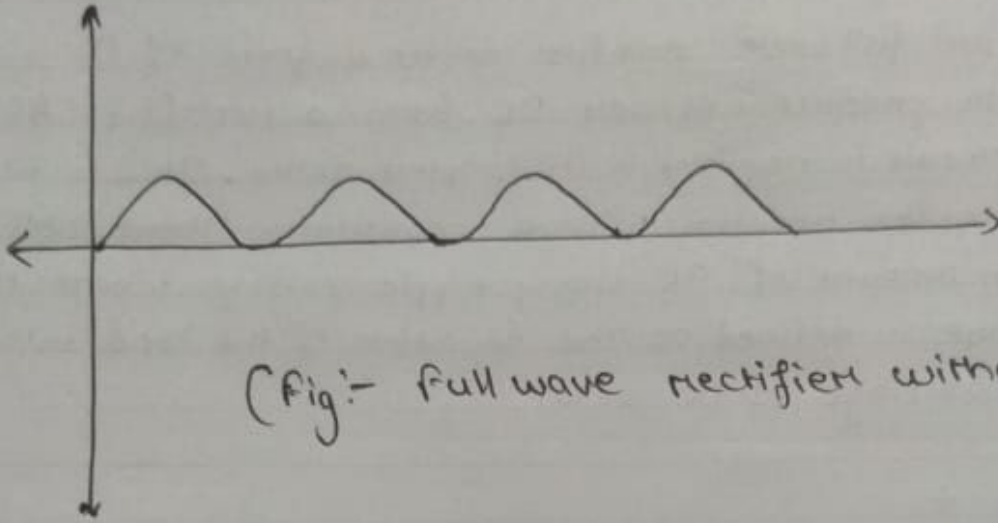IV) The ripple voltage of output was measured.

RESULT :—

The output dc voltage with filter across load R_L is 6.06v in halfwave rectifier whereas theoretically calculate the dc value is 1.16v in halfwave rectifier and the output dc voltage with filter across load R_L is 5.70v in full wave rectifier and theoretically calculate the dc value is 0.498v in full wave rectifier. The form factor is 1.59v and 1.17v in halfwave and full wave rectifier respectively. The ripple factor is 1.24v in half wave rectifier and 0.614v in full wave rectifier respectively.

Conclusion :—

The above experiment was conducted successfully. We can conclude that halfwave and full wave rectifier circuits can be built and it can measure and record their output voltages and curves systematically. Half wave and full wave rectifiers are used to convert AC into DC voltage. Therefore it is important to carry out this experiment to increase the understanding on rectifier in industries.

OBSERVATIONS :—

| Type of Rectifier	Input the voltage (Transformer Secondary) V_{rms}, V_{max}, V_{pk-pk} from CRO	Rectifier Output V_m, V_{rms}, V_{mean}/V_{dc} (DC coupling mode of CRO)	from factor $\left(\dfrac{V_{rms}}{V_{dc}}\right)$	Ripple factor $\sqrt{\left(\dfrac{V_{rms}}{V_{dc}}\right)^2 - 1}$	Measure output d.c. vol. with filter multimeter in dc mode	Ripple output voltage with filter multimeter in ac mode	Theoretically calculated the dc value. expected. $V_{dc} = V_m - A/2$ where $A = V_R(r-P)$ $= \dfrac{2}{\sqrt{3}} V_{rms}$
Half Wave	$V_{rms} = 5.4$ V $V_{pk-pk} = 16.4$ V $V_{max} = 7.8$ V	$V_{mean} = 2.14$ V $\overline{V_{dc}}$ $V_{rms} = 3.41$ V $V_{max} = 7$ V	1.598 V	1.24 V	6.06 V	0.334 V	7.16 V
Full wave	$V_{rms} = 5.4$ V $V_{pk\,pk} = 16.4$ V $V_{max} = 7.8$ V	$V_{mean} = 2.45$ V $\overline{V_{dc}}$ $V_{rms} = 4.05$ V $V_{max} = 6$ V	1.174 V	0.614 V	5.74 V	0.144 V	0.442 V

③

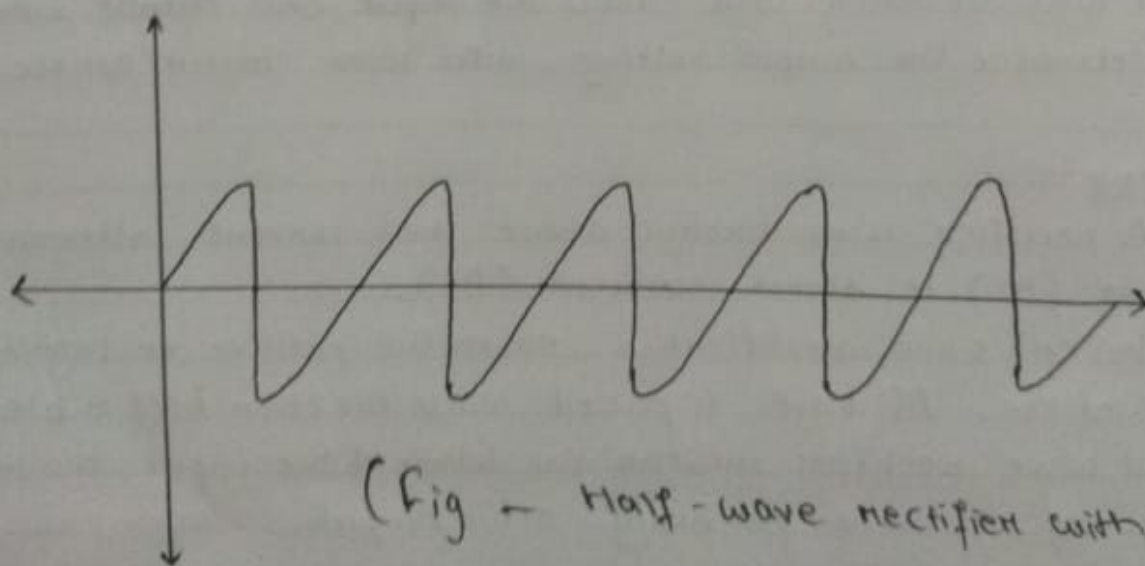(Fig:- Full wave rectifier without filter.)
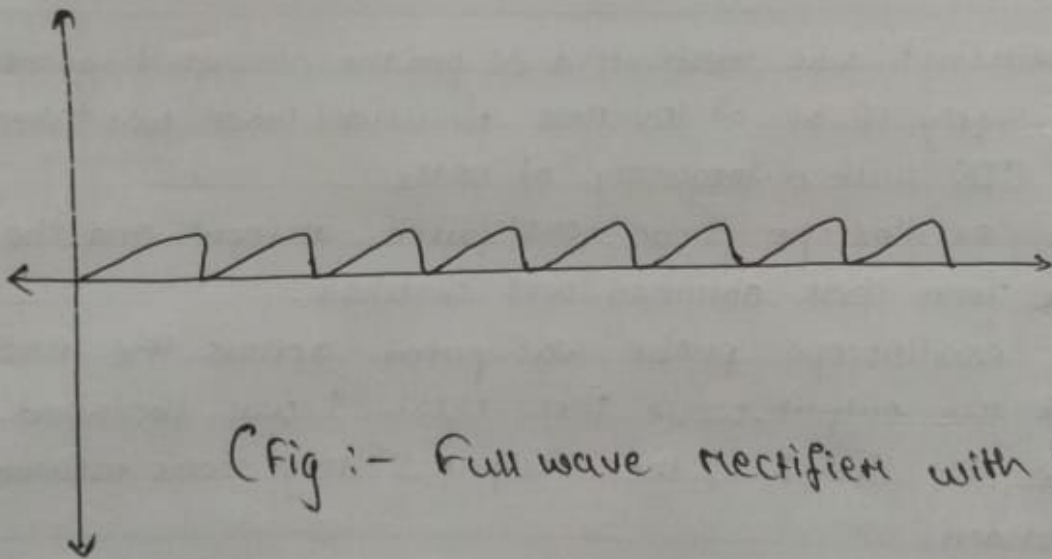
(Fig :- Full wave rectifier with filter)
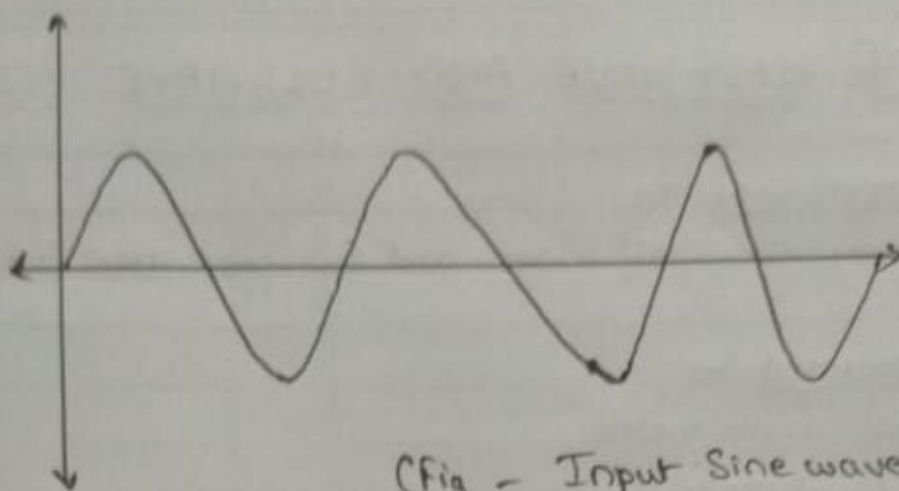
(fig — Input Sine wave)
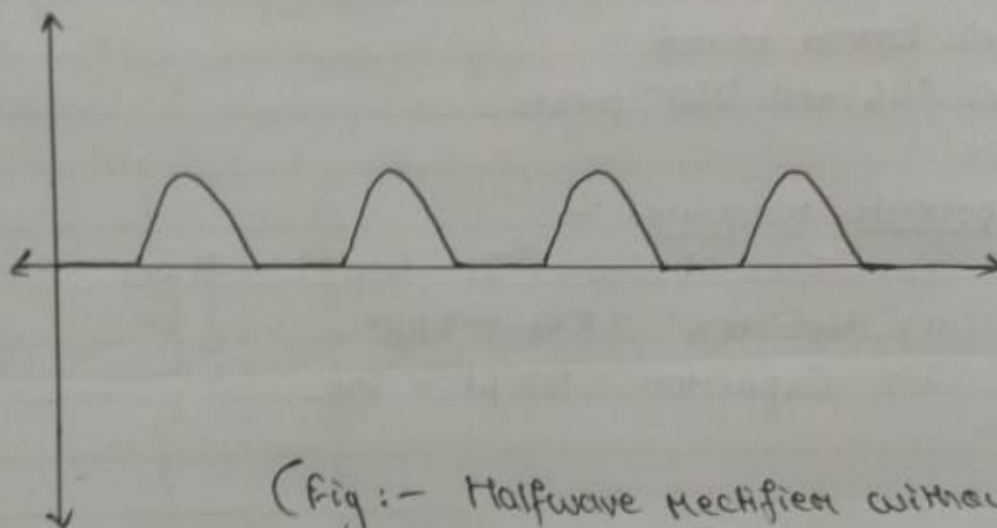
(Fig :— Halfwave rectifier without filter)

(Fig — Half-wave rectifier with filter)

Halfwave and full wave rectifier deliver a form of DC output. In order to produce steady DC form a rectified AC supply, a filter circuit is required in its simplest form. This is achieved by shunting the resistor with a capacitor. There will still remain an amount of AC supply ripple voltage where the ripple voltage is defined as the deviation of the load voltage from its average of DC value.

Procedure :-
Halfwave Rectification / FullWave Rectification :-

(A) I) The circuit was constructed as per the circuit diagram shown.
II) The supply of 5V or 10V rms sinusoidal wave was taken from the CDS with a frequency of 50Hz
III) The oscilloscope probe was puted at input and the input wave form that obtained was sketched.
IV) The oscilloscope probe was puted across the resistor and the output wave from obtained was sketched.
V) The DC level of the output voltage was measured and recorded.
VI) Now the capacitor across the resistor was connected and the filtered output voltage was measured.
VII) The ripple voltage was measured.

(B) For a fullwave rectifier :
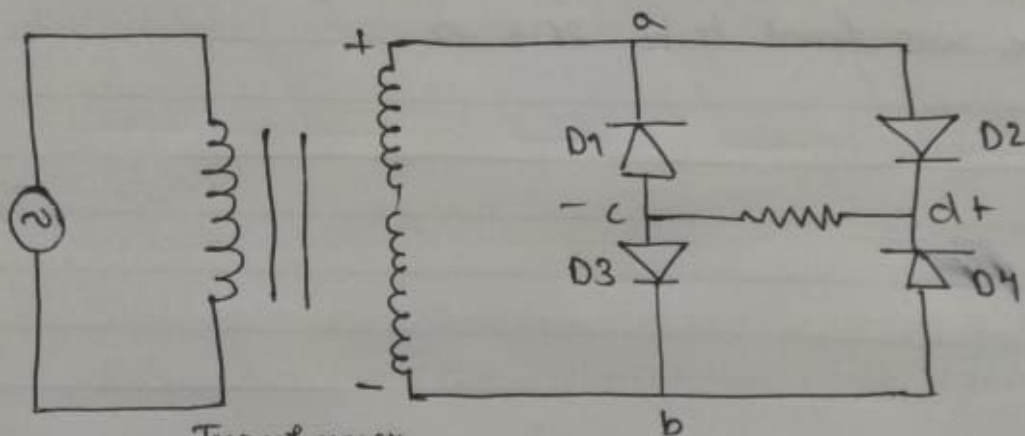I) The given circuit diagram was implemented on broadband along with a 5V peak to peak sinusoidal (AC voltage) from bread board itself.

D1

DIN4007

230V Vin

2

1kΩ R₁

1

Vout
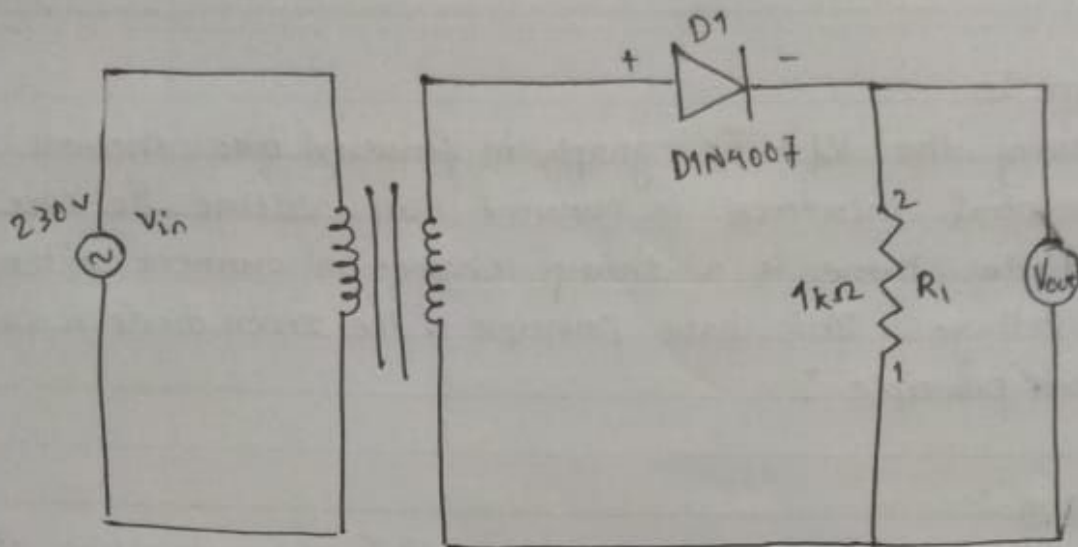
Transformer.

(Fig — Circuit diagram of Half wave Rectifier)

a

D1

- c ⌇⌇⌇ d +

D3

D2

D4

b

Transformer

(Fig:- Circuit diagram of full wave Rectifier)

STUDY OF HALFWAVE AND FULLWAVE RECTIFIER

Aim of the experiment :-
To study the half wave and fullwave rectifier.

Equipment required :-
i) Digital Multimeter
ii) 5V AC supply
iii) CRO
iv) Bread board
v) CDS and DSO probes.

Components required :-
i) Silicon diodes (Si- 4007) - 4 Nos.
ii) Resistor 1kΩ - 1 NO
iii) Capacitor 100 µF - 1no.

Objects :
i) To design circuit diagram of half wave and full wave rectifier.
ii) To take reading and draw the input and output waveforms.
iii) Determine the output voltage with biter circuit across load(R_L)

Theory :
A rectifier is an electric device that converts alternating current (AC) to direct current (DC).

In half wave rectification, either the positive or negative half of the AC wave is passed, while the other half is blocked. A full wave rectifier converts the whole of the input waveform to one of constant polarity at its output.

Teacher's Signature