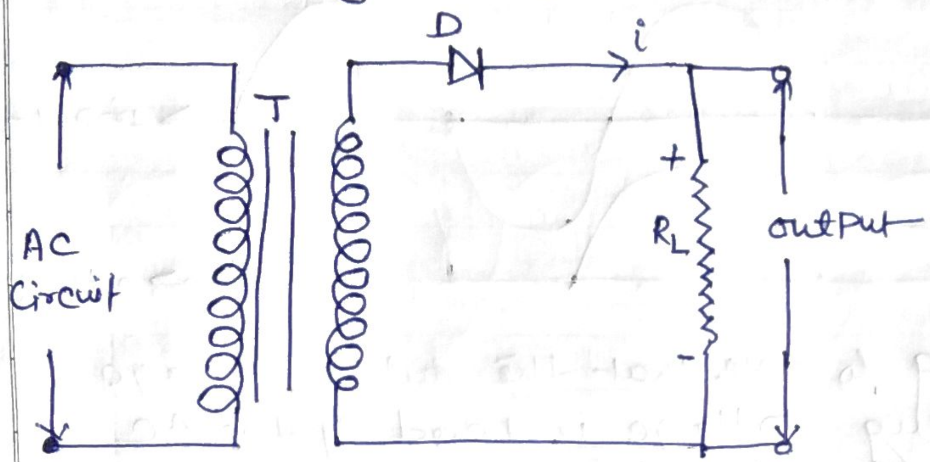
B.Sc-II, Paper-IV, Group-B.

HALF-WAVE RECTIFIER:-

A half Wave Rectifier (one diode) Converts the applied alternating voltage to a pulsating voltage using half cycle of the applied voltage. That is the conduction takes place during half cycle only.



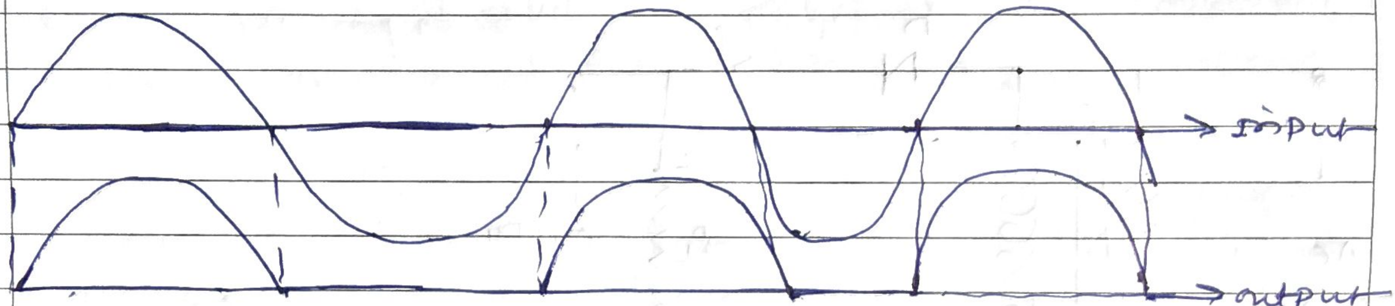
The Circuit of Half wave Rectifier using a crystal diode as shown above, the circuit input is an ac voltage applied across the series Connected diode and the load resistance R_L. The Power transformer T used in the circuit has the following two advantages:-

(i) It helps to step up or step down the peak value of the a-c input voltage.

(ii) It isolates the rectifier circuit and the chassis from the power line and thus any chessis shockes can be avoided.

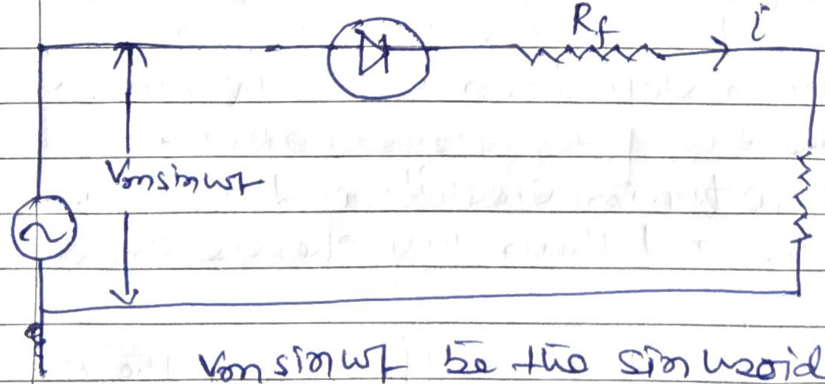
During the positive half cycle of the Ac voltage the p-region or the anode of the diode D is positive with respect to Cathode and the current flows in the Circuit while during the Negative half cycle since the anode is Negative with respect to Cathode no current flows.

Now, as the variation of current will follow the variation of input voltage, the output voltage across the load resistance R_L should follow the positive half cycle.



It is interesting to note that the output voltage is now pulsating voltage instead of the AC voltage applied at the input.

In a circuit for an ideal rectifier, there is a definite slope in the conduction region. Now,



A Resistor R_f is connected with R_L so that the total impedance in the circuit is $(R_f + R_L)$. If i be the flow of current and $V_m \sin\omega t$ be the sinusoidal input voltage, then the output voltage $V_{out} = i.R_L$

and the value of maximum current $I_m = \frac{V_m}{R_f + R_L}$