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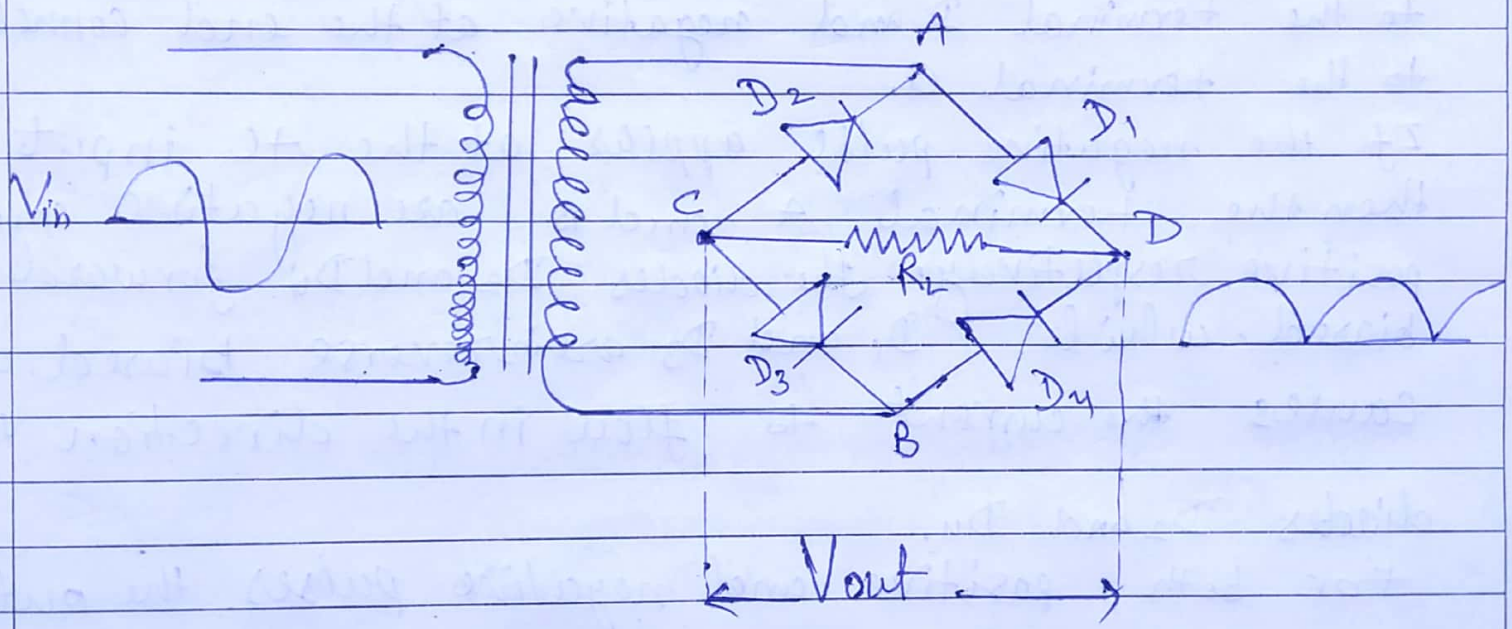
B.Sc. Part-2 Physics (Hons) paper-IV.

Lecture-No-42

Bridge Rectifier ⇒

Bridge rectifier are the circuits which convert alternating current (AC) into direct current (DC) using the diodes arranging in the bridge circuit configuration.



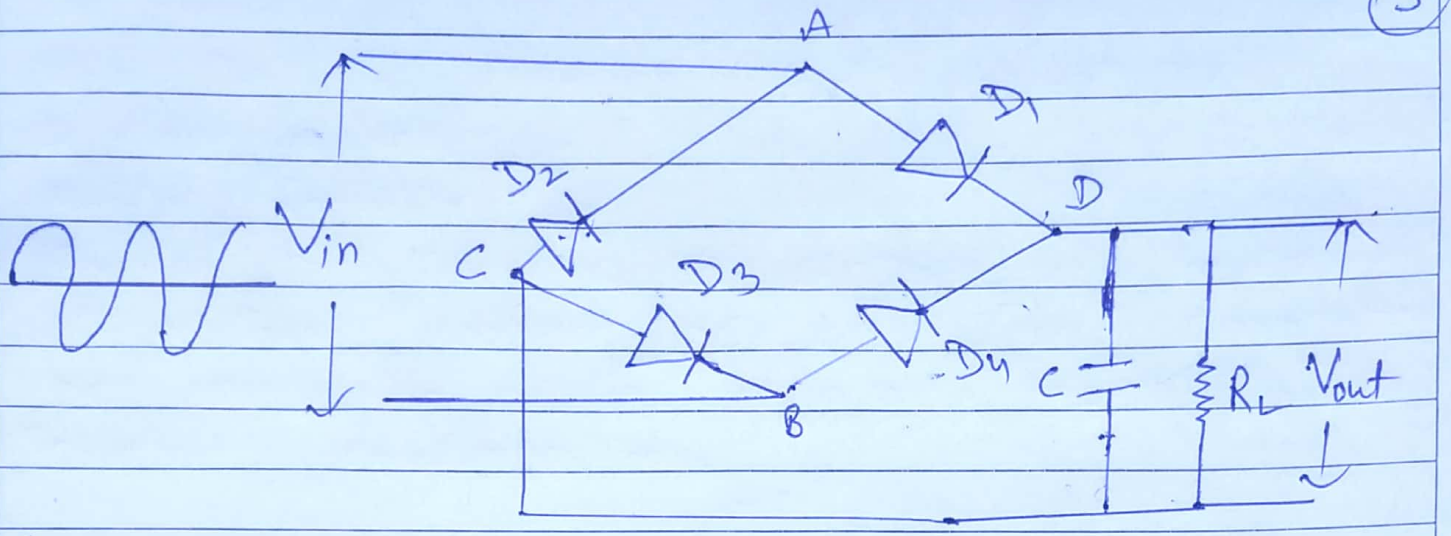
Such bridge rectifier composed of four diodes, D_1, D_2, D_3 and D_4 in which the input is supplied across two terminal A and B. which is shown in above figure while the output is collected across the load resistor R_L connected between the terminals C and D.

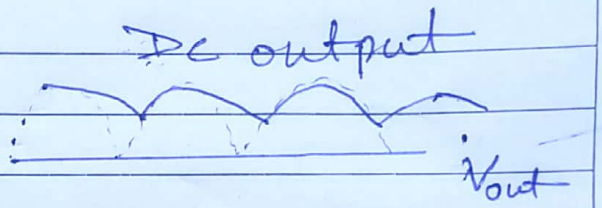
Now consider the case wherein the positive pulse appears at the AC input i.e the terminal A is positive while the terminal B is negative. This cause the diodes D_1 and D_3 to get forward biased and at the same time, the diodes D_2 and D_4 will be reverse biased.

As a result, the current flows along the short circuited path created by the diodes D_1 and D_3. Thus the voltage developed across the load resistor R_L will be positive towards the end connected to the terminal D and negative at the end connected to the terminal C.

If the negative pulse appears at the AC input then the terminal A and B are negative and positive respectively. The diodes D_2 and D_4 forward biased, while D_1 and D_3 are in reverse biased, which causes the current to flow in the direction through diodes D_2 and D_4.

For both positive and negative pulses the output of bridge rectifier will be identical in polarity. However it is to be noted that the bridge rectifiers DC will be pulsating in nature. In order to obtain pure form of DC, one has to use capacitor in conjunction with the bridge circuit.





The positive pulse at the input causes the capacitor to charge through the diodes D_1 and D_3. However as the negative pulse arrives at the input, the charging action of the capacitor ceases and it starts to discharge through R_L. This result in the generation of DC output which will have ripples in it.

This ripple factor is define as the ratio of AC component to the DC component in the output voltage.

The ripple voltage is given by the equation.

$$V_r = \frac{I_L}{fC}$$

where V_r represent the ripple voltage, I_L is load current, f represent the frequency of the ripple and C is the capacitance.