Full Wave Rectifier

Full Wave Rectifier: Full wave rectifier using two diode and centre tapped transformer. When a is positive with respect to b diode D1 conducts for π radians. In the next half cycle b is positive with respect to a and therefore diode D2 conducts. The output voltage is shown as VO. The waveform for output current io is similar to VO waveform. When a is positive with respect to b, diode D2 is subjected to a reverse voltage of 2VS. In the next half cycle, diode D1 is a reverse voltage of 2VS. Thus, for diodes D1 and D2, peak inverse voltage is 2Vm. So that for one cycle of source voltage, there are two pulses of output voltage.

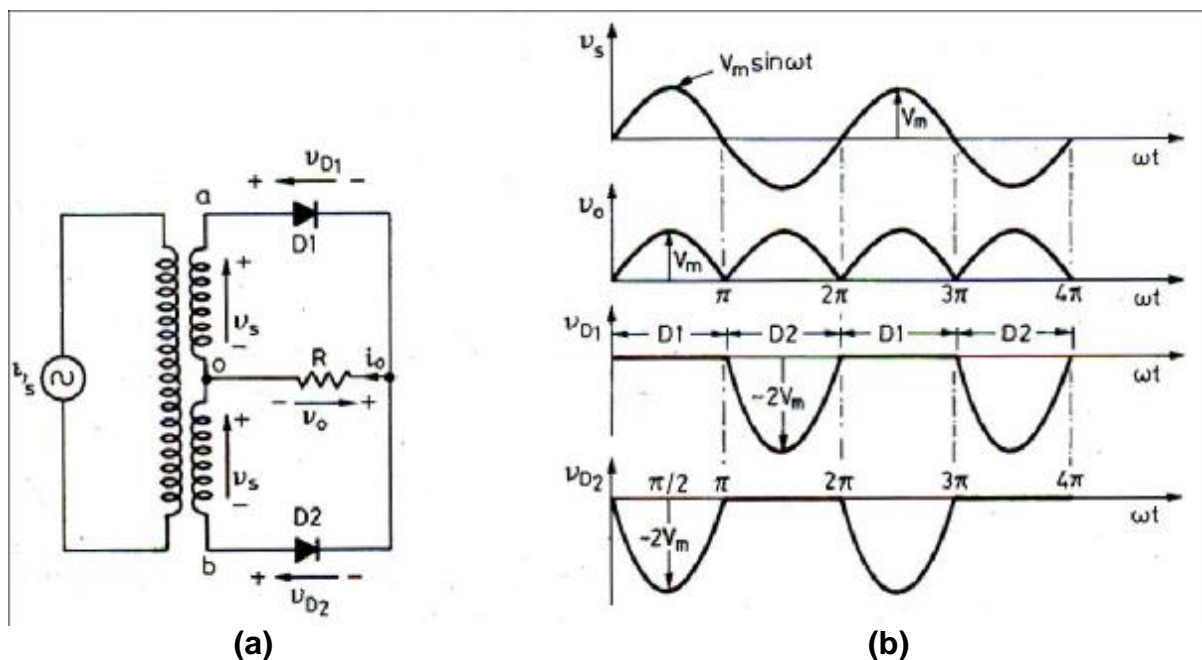
(a)   (b)

Fig. (a) Full Wave (Mid Point) Rectifier (b) Waveform of Full Wave Rectifier

So full wave diode rectifier can also be called two pulse diode rectifiers.

Average output voltage .

$$V_0 = \frac{1}{\pi} \int_0^\pi V_m \sin \omega t \, d(\omega t) = \frac{2V_m}{\pi}$$

Average output current ,

$$V_{or} = \left[\frac{1}{\pi} \int_0^\pi V_m^2 \sin^2 \omega t \, d(\omega t) \right]^{1/2}$$

Rms value of output voltage ,

$$V_o = V_m / \sqrt{2} = V_s$$

Rms value of load current,

$$I_o = V_s / R$$

Power delivered to load $= V_o . I_o$
$$= I_o^2 . R$$
$$= V_s . I_o$$