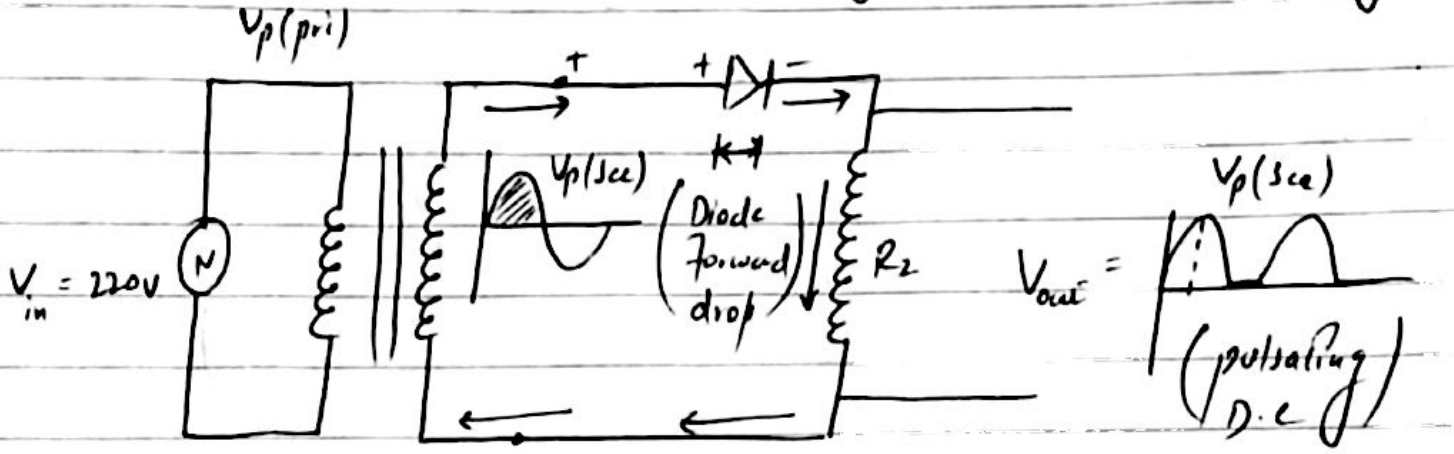
Subject _____ Date 14/01/25

(Lecture 11) Rectifiers

→ Electronic device or circuit to convert A.C signal into D.C signal.



(Half - Wave Rectifier)

$$V_{(out)} = \left(V_{p(sec)} - 0.7\ V\right)$$

Factors that affects rectifiers:-

(i) V_{avg} (Average Volt value):-

Rms (Root mean Square Value) = V_{avg}

$$V_{avg} = \frac{1}{2\pi} \int_0^{\pi} V_{p(sec)} \sin\theta\, d\theta$$

$$V_{avg} = \frac{V_{p(sec)}}{2\pi} \int_0^{\pi} \sin\theta\, d\theta$$

$$V_{avg} = \frac{V_{p(sec)}}{2\pi}\left(-\cos\theta\Big|_0^{\pi}\right)$$

$$V_{avg} = \frac{V_{p(sec)}}{2\pi}\left(\cos\pi - \cos 0\right)$$

$$V_{avg} = \frac{V_{p(sec)}}{2\pi}\left(-1-1\right)$$

$$V_{avg} = \frac{-2\left(V_{p(sec)}\right)}{2\pi} = V_{p(sec)}/\pi$$

$$V_{avg} = \frac{V_{p(sec)}}{3.1415} = \boxed{0.37\ V_{p(sec)}}$$

→ Half-wave rectifier gives us 37% of input in output ($V_{p(sec)}$).

Limit of Rectifier:-

Peak inverse voltage (PIV) of diode is the broken point.

It should be

$$\boxed{V_{break}\ (PIV) > V_{p(sec)}}$$