ANALOG ELECTRONICS

2nd Semester

Handwritten Notes

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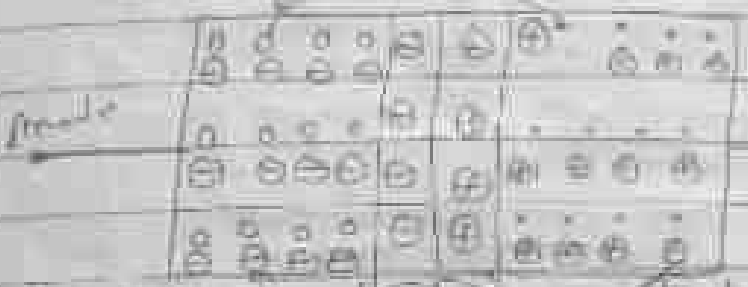
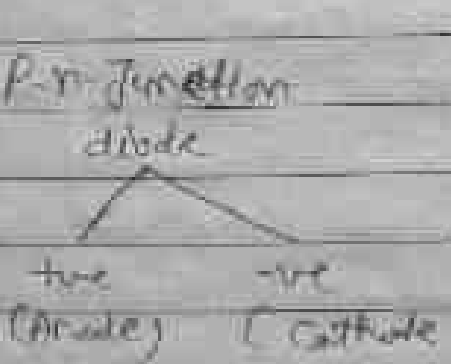
holes & electrons are mobile

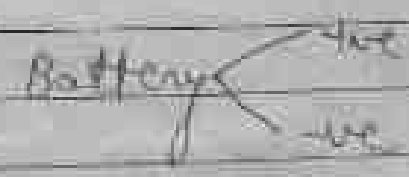


Biasing :- It is the process in which P-n Junction diode connected with External source of energy (Battery)

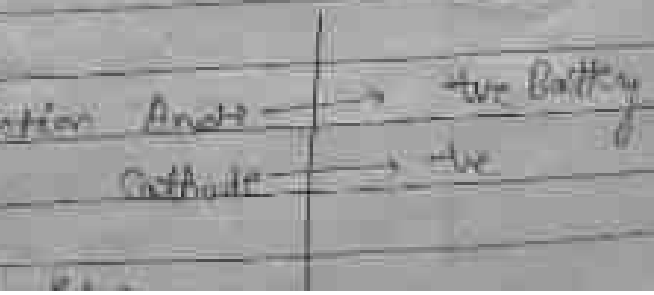
Biasing of P-n Junction diode

(i) Forward Biasing (ii) Reverse Biasing.



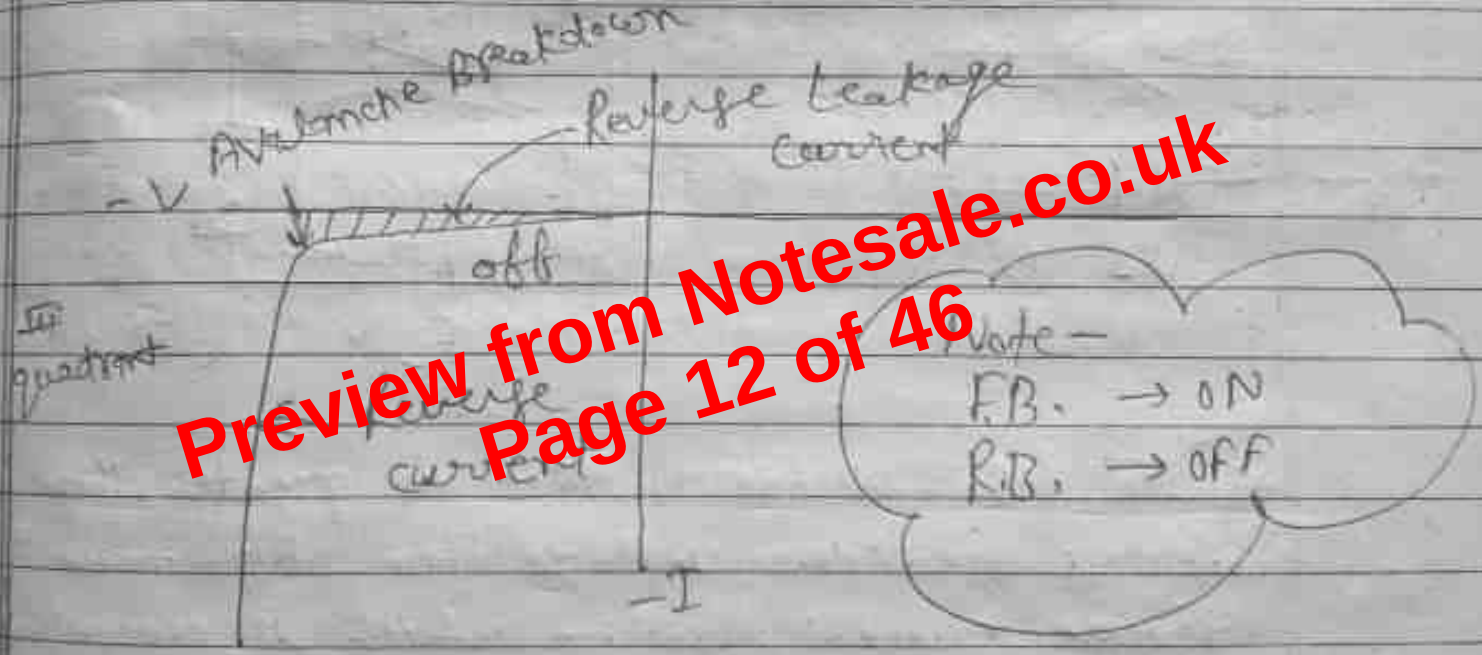


(i) Forward Biasing :-



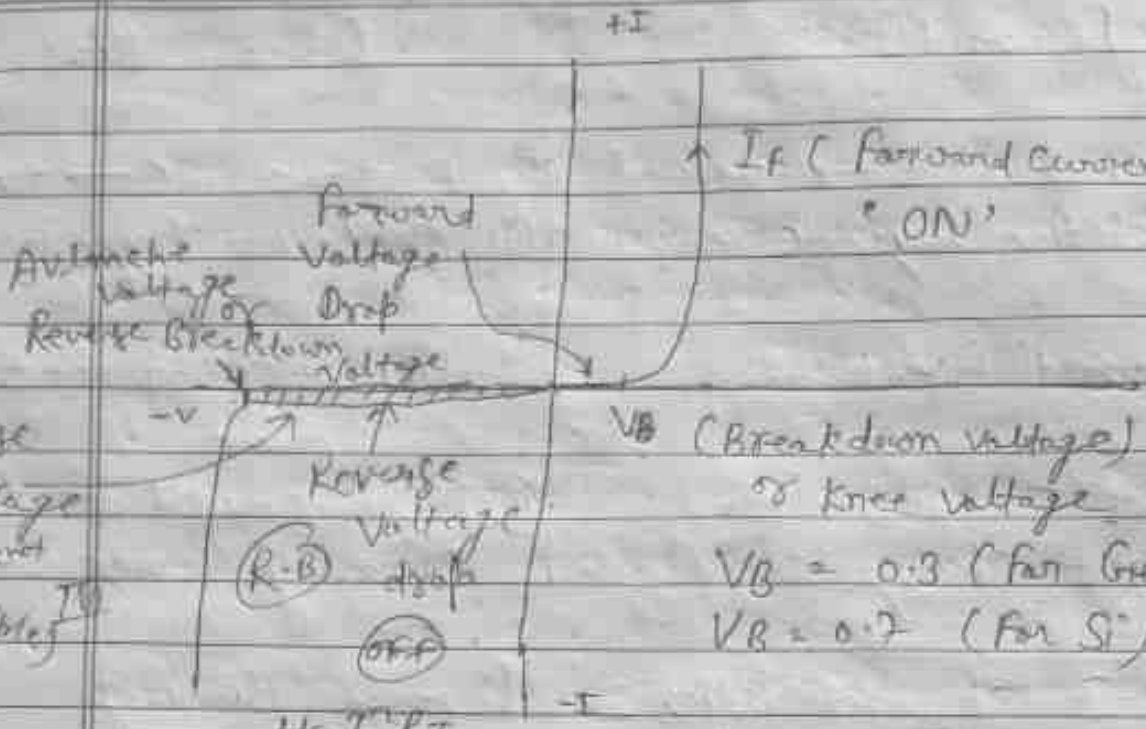
Forward Bias	Reverse Bias
A → +ve , C → -ve	(i) A → -ve , C → +ve
Depletion layer decreases	(ii) Depletion layer increases
Forward Breakdown	Reverse / Avalanche Breakdown
It is caused due to Majority Charge carriers.	(iv) It is caused due to Minority Charge Carriers

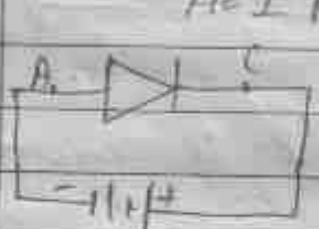
V-I characteristics In Reverse Biasing



Reverse leakage Current :- The current produced due to minority charge carriers in P-n junction diodes is called Reverse leakage current

V-I characteristics





* In R.B. : When voltage is greater than Reverse Breakdown Voltage then high amount of reverse current produce which is uncontrollable. So we should always remember that voltage should not become greater than R.V.B.

* Voltage drop in R.B. is greater than in F.B. because of minority charge carriers.

*	F.B.	R.B.
	ON	OFF
	Voltage drop ↓	Voltage drop↑
	due to majority	due to minority

Resistance of P-n Junction diode :

(1) Static Resistance (2) Dynamic Resistance

(1) Static Resistance :- If P-n Junction diode connected with dc circuit then the produced resistance is called Static Resistance.

$$R_{dc} = \frac{V_D}{I_D}$$

(2) Dynamic Resistance :- If the value of current is fixed then average current then the produced resistance is called Dynamic Resistance.

$$R_{ac} = \frac{\Delta V_D}{\Delta I_D}$$

ΔV_D = Change in diode voltage

ΔI_D = Change in diode current

Use of P-n Junction diode as Rectifier

Rectifier Circuit → Converts → AC → DC (into)

* Production AC (✓) DC (✗)

Rectifier :- It is a circuit which converts AC into D.C.

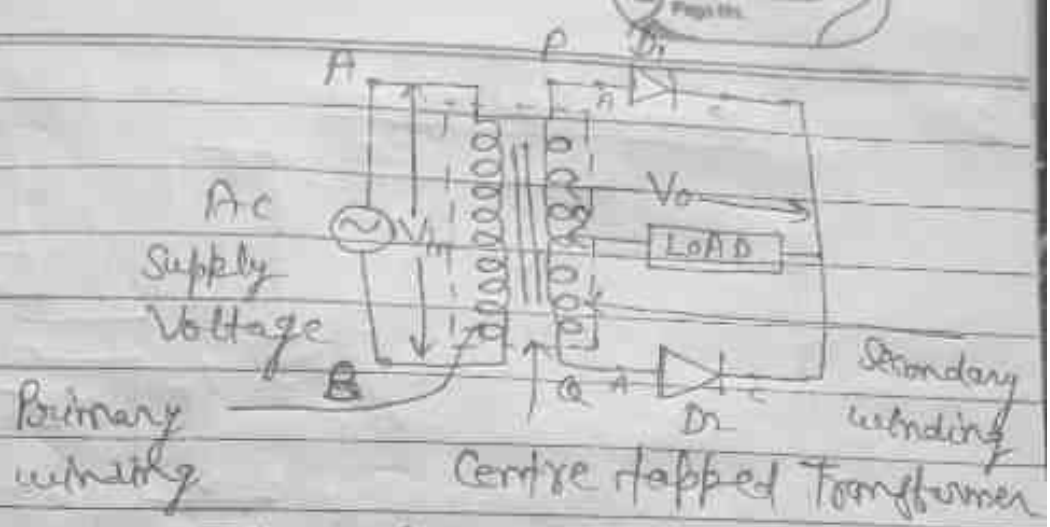
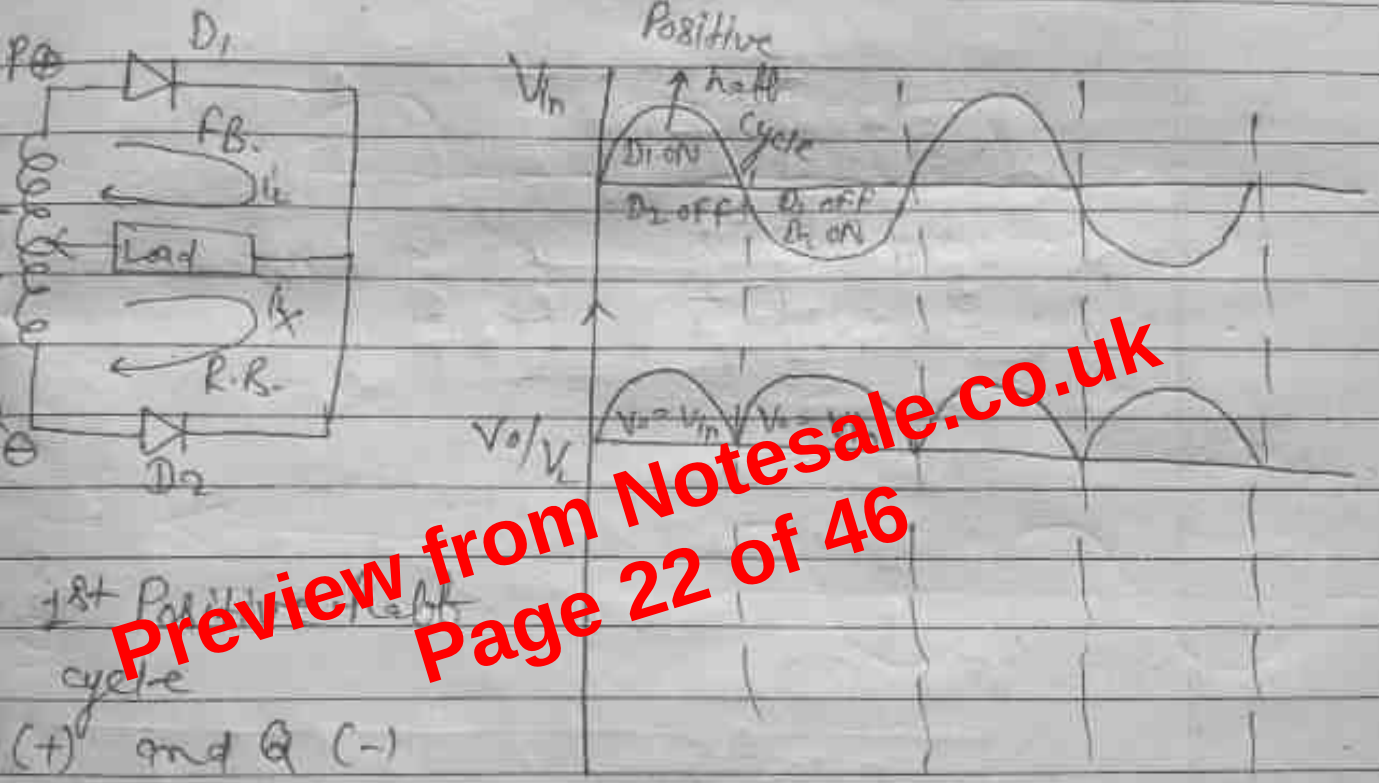


Fig: Centre Tapped full wave Rectifier.

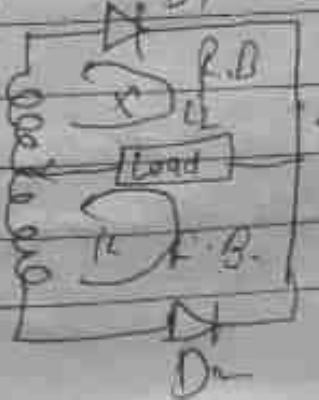


* In 1st Positive half cycle
P (+) and Q (-)
with respect to O.

For Diode D_1, P(+) & O(-) so, D_1 goes in F.B.

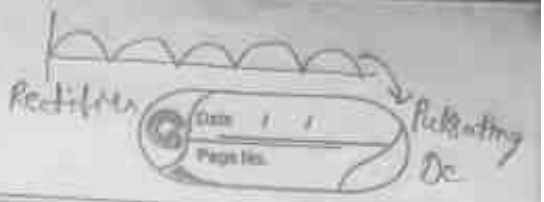
& Diode D_2, Q(-) & O(+) so, D_2 goes in R.B.

* In 1st Negative half cycle



For Diode D_1, P(-), & O(-) so
D_1 goes in R.B.

& Diode D_2, Q(+), O(-)
so D_2 goes in F.B.



Filter :- The filter circuit is necessary for smoothing of the voltage obtained by the rectifier.

Capacitor connected only in parallel. So it is also called Shunt Filter.

Inductor connected in Series.

Filter circuit :- It is an A.C. circuit that filters the input signal to desired output signal.

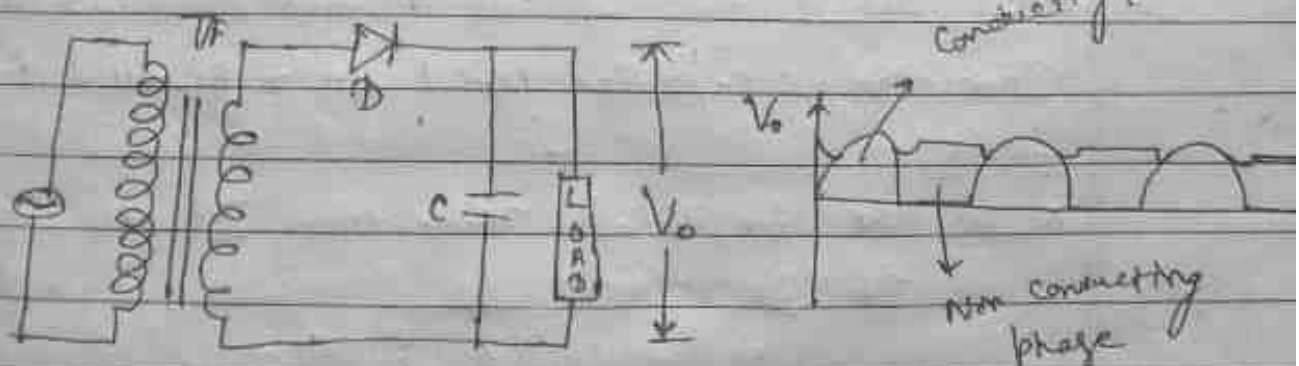
* Types of Filter circuit

(i) C- Filter (ii) L- Filter

(iii) LC - Filter

(i) C- Filter circuit

* For Half wave Rectifier



With Filter