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1. State the two conditions that must be satisfied for passing current in diode.

2. For zener diode**.** What is:

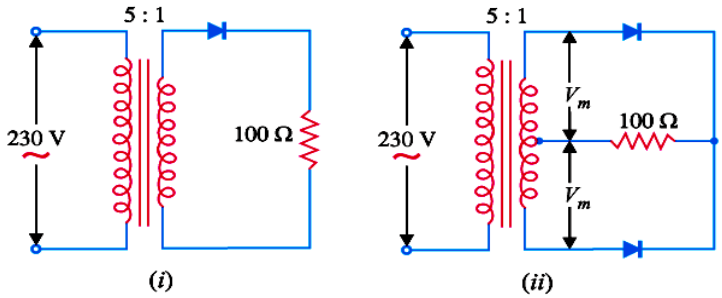
a. The aim of its design?

b. The key for its operation?

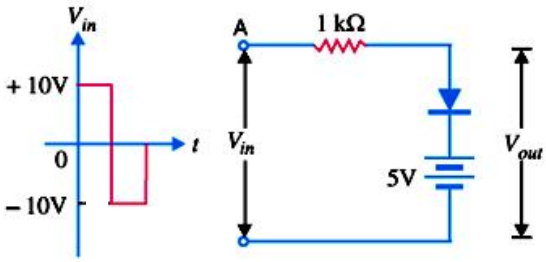
c. The two types of reverse breakdown? (Complete answer using *VI* ch/s).

3. In the rectifier circuits shown in Fig. (i) & (ii). The source is connected to 230V (rms), 50Hz. A load of 100Ω is used. Assume practical diode (0.7V). Find:

(a) DC output voltage. (b) *PIV* of each diode. (c) Output frequency. (d)$V_{P(out)}$.



4. For the clipping circuit shown in the Figure, if ideal diode: Sketch to scale the output waveform of the voltage and current. If the input frequency is 50Hz, What is the value of the output frequency?



Model Answer

1. State the <u>two conditions</u> that must be satisfied for passing current in diode. **(1 point)**

***Answer*:**

- Source voltage or bias voltage should be greater than barrier potential.
- Positive terminal of the source connect to anode & Negative terminal of the source connect to cathode.

2. <u>For zener diode</u>. What is:

a. The aim of its design? **(1 points)**

b. The key for its operation? **(1 points)**

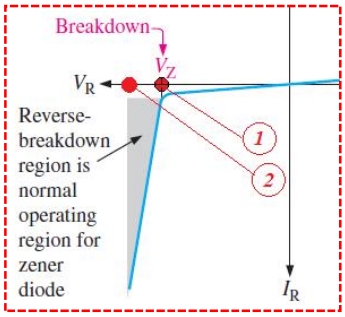
c. The two types of reverse breakdown? (Complete answer using VI ch/s). **(1 points)**

Answer

Aim: It is used to limit the voltage across its terminals when it is reverse biased.

Key: - It is designed to operate in reverse breakdown.
- When reaches the reverse breakdown; its voltage is constant even though the current changes drastically.

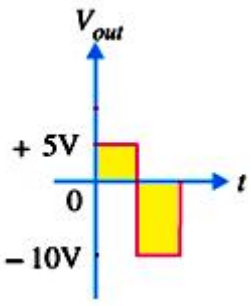
Types: 1- Zener breakdown V_Z
2- Avalanche breakdown



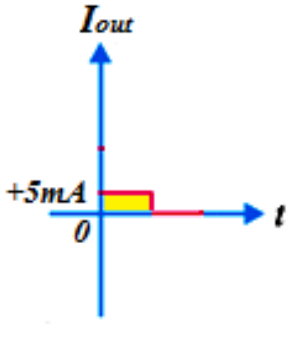
3. *Answer*

Item	Fig (i)	Fig (ii)
(a)	$V_{DC}=\frac{V_{Peak(out)}}{\pi}=\frac{V_{Peak(sec)}-0.7}{\pi}=20.47V$ **(1 point)**	$V_{DC}=\frac{2V_{Peak(out)}}{\pi}=\frac{2(\frac{1}{2}V_{Peak(sec)}-0.7)}{\pi}=\frac{2*31.8}{\pi}=20.24V$ **(1 point)**
(b)	$PIV=V_{Peak(sec)}=65V$ **(1 point)**	$PIV=(V_m-0.7)-(-V_m)=2V_m-0.7=2\frac{1}{2}V_{Peak(sec)}-0.7=2*32.5-0.7=34.7V$ **(1 point)**
(c)	$f_o=f_i=50Hz$ **(0.5 point)**	$f_o=2f_i=100Hz$ **(0.5 point)**
(d)	$V_{Peak(out)}=V_{Peak(sec)}-0.7=64.3V$ **(0.5 point)**	$V_{Peak(out)}=\frac{1}{2}V_{Peak(sec)}-0.7=32.5-0.7=31.8V$ **(0.5 point)**

4. Answer



(2 point)



(2 point)

$f_o=f_i=50Hz$

(1 point)