School of Engineering and Technology

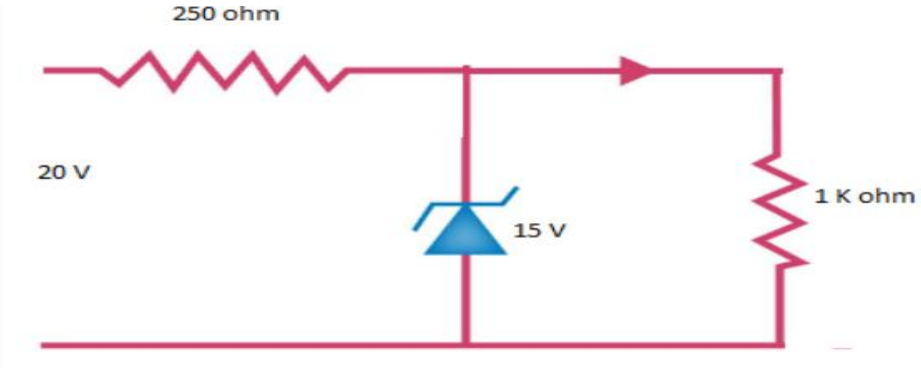
Subject: BEEE **Subject Code: 24BEELY104**

UNIT 3

Sample Questions: **2 Marks**

- ✓ Mention any two applications of PN diode?
- ✓ Why a series resistor is necessary when a diode is forward biased?
- ✓ What is hole and electron in p-n junction diode?
- ✓ What are the two types of semiconductors?
- ✓ What are the main types (any two) of diodes?
- ✓ What are the three regions in which diodes function?
- ✓ What is a PN Junction? How is it formed?
- ✓ What are the types of extrinsic semiconductor?
- ✓ Define extrinsic semiconductor.
- ✓ Define intrinsic semiconductor.
- ✓ What is P-type semiconductor?
- ✓ What is N-type semiconductor?
- ✓ Define doping.
- ✓ Define biasing and mention the types of biasing?
- ✓ What is meant by forward bias?
- ✓ What is meant by reverse bias?
- ✓ What is depletion region?
- ✓ Mention one application of zener diode?
- ✓ For a Half wave rectifier the minimum number of diodes required is _____
- ✓ For a centre tapped full wave rectifier the minimum number of diodes required is _____
- ✓ The maximum efficiency of a half wave rectification is _____
- ✓ The maximum efficiency of a full wave rectification is _____
- ✓ Define efficiency of a rectifier.
- ✓ Photodiode is used to detect _____ light.

- ✓ A Zener diode, having breakdown voltage equal to 15 V, is used in a voltage regulator circuit shown in the figure. The current through the diode is



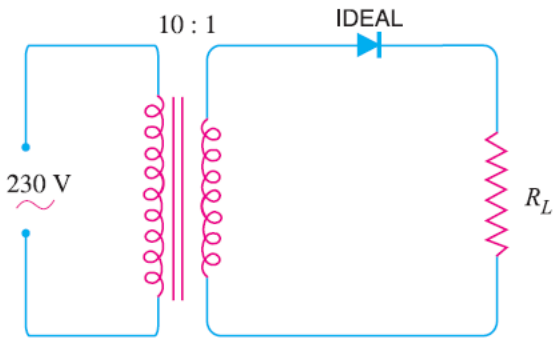
Sample Questions: **5 Marks**

- ✓ Explain PN junction diode with necessary equations and diagrams?
- ✓ Draw the equivalent circuit of PN junction diode?
- ✓ Draw the VI characteristics of a PN junction diode.
- ✓ Write short notes on: (i) Photodiode (ii)Photo coupler
- ✓ Differentiate between half wave and full wave rectifiers (consider 5 parameters).
- ✓ Show that the average or DC load current (I_{dc} or I_{av}) of a half wave rectifier is I_m/π.
- ✓ Show that the average or DC load current (I_{dc} or I_{av}) of a half wave rectifier is $2I_m/\pi$.
- ✓ Compare zener breakdown and avalanche breakdown (consider 5 parameters).
- ✓ Show that the root mean square value of the load current $I_{rms} = 0.707\ I_m$.
- ✓ A half-wave rectifier is used to supply 50V d.c. to a resistive load of 800 Ω. The diode has a resistance of 25 Ω. Calculate a.c. voltage required.

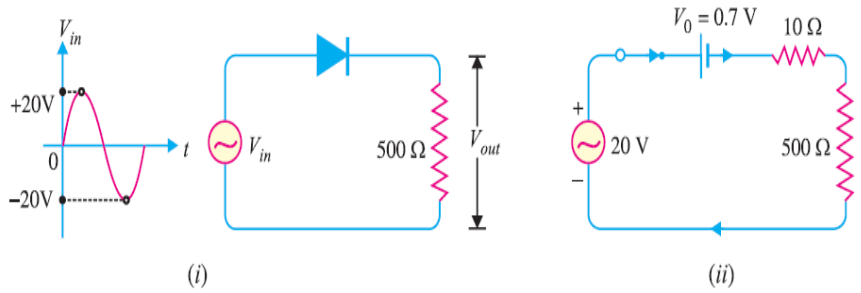
Sample Questions: **10Marks**

- ✓ What is a PN junction diode? With a neat diagram explain the forward and reverse characteristics of PN junction diode?

- ✓ With necessary waveforms and circuit diagram explain the working of a half wave rectifier?
- ✓ With necessary waveforms and circuit diagram explain the working of a full wave rectifier with capacitive filter?
- ✓ With an appropriate circuit explain how zener diode can be used as voltage regulator?
- ✓ A diode used as a half wave rectifier whose internal resistance is 20Ω is to supply power to 1000Ω load from 110Vrms.source of supply. Calculate Peak load current, DC load current, Ac load current, DC power, AC input power, Rectification efficiency.
- ✓ In a center tapped FWR, the rms half wave secondary voltage is 10V. Assuming ideal Diode and load resistance of RL = $2K\Omega$ Find peak current, DC load voltage, ripple factor, efficiency of rectification.
- ✓ A half wave rectifier is connected to a transformer with turns ratio 4:1 find its average DC output voltage, PIV of diode and ripple frequency if input voltage is 200 V rms, 50 Hz mains supply.
- ✓ An a.c. supply of 230 V is applied to a half-wave rectifier circuit through a transformer of turn ratio 10: 1. Find (i) the output d.c. voltage and (ii) the peak inverse voltage. Assume the diode to be ideal.

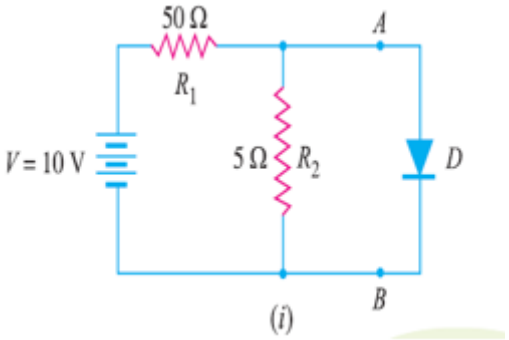


- ✓ An a.c. voltage of peak value 20 V is connected in series with a silicon diode and load resistance of 500ohms. If the forward resistance of diode is 10 ohms, find :(i) peak current through diode (ii) peak output voltage. What will be these values if the diode is assumed to be ideal?



(i) (ii)

Find the current through the diode in the circuit shown in Fig. (i). Assume the diode to be ideal.



(i)

A crystal diode having internal resistance rf = 20Ω is used for half-wave rectification.

If the applied voltage v = 50 sin ω t and load resistance RL = 800 Ω, find:

(i) Im, Idc, Irms
(ii) a.c. power input and d.c. power output
(iii) d.c. output voltage
(iv) Efficiency of rectification.

Note: In Rectifiers topic study only half wave, full wave and half wave rectifier with capacitive filter.