



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING



UNIT V

RECTIFIERS AND POWER SUPPLIES

1. What is a rectifier?

A rectifier is a device which converts alternating current (or voltage) into unidirectional current (or voltage).

2 . What is PIV of a diode in a rectifier circuit?

Peak Inverse Voltage (PIV) is the maximum possible voltage that occurs across a diode when it is reverse biased.

3.What is the importance of peak inverse voltage?

If the applied voltage in reverse biased condition exceeds peak inverse voltage (PIV) rating of the diode, then the diode may get damaged.

4. Why half-wave rectifiers are generally not used in dc power supply?

The type of supply available from half-wave rectifier is not satisfactory for general power supply. That is why it is generally not used in dc power supply.

5. Why diodes are not operated in the breakdown region in rectifiers?

In breakdown region, a diode has a risk of getting damaged or burnt because the magnitude of current flowing through it increases in an uncontrollable manner. That is why diodes are not operated in the breakdown region in rectifiers.

6.Define ripple as referred to in a rectifier circuit.

The ac component contained in the pulsating output of a rectifier is known as ripple.

7. What is transformer utilization factor?

Transformer utilization factor is defined as the ratio of power delivered to the load and ac rating of secondary of supply power transformer.

8. The output of a 60Hz full-wave bridge rectifier has a 60 Hz ripple. It this circuit working properly?

A full-wave rectifier with 60Hz input must have lowest ripple frequency equal to twice the input frequency i.e. 120Hz. If the ripple frequency is 60Hz, it means some diodes in the circuit are not working.

9. What is meant by filter?

Filter is a device that converts pulsating output of rectifier into a steady dc level.

10. Why series inductor and L-section filters cannot be used with half-wave rectifiers?

Series inductor and L-section filters cannot be used with half-wave rectifiers because operation of series inductor depends upon the current through it and needs a minimum current to flow at all times.

11. Why capacitor input filter is preferred to choke input filter?

In capacitor input filter, the dc output is much larger and ripples are less in comparison to those in choke input filter. So, capacitor input filter is preferred to choke input filter.

12. Why π -filters are not suitable for varying loads?

Voltage regulation in case of π -filters is very poor and, therefore, π -filters are not suitable for varying loads.

13. Why R-C filters are suitable only for light loads?

R-C filters have poor voltage regulation and need adequate ventilation to dissipate the heat developed in the resistor R. Thus R-C filters are suitable only for light loads.

14. Why is bleeder resistance employed in a filter circuit?

A resistance, called the bleeder resistance, is placed across the filter output, to provide flow of necessary minimum current through the choke at all time.

15. What is the purpose of bleeder resistance in a rectifier circuit using L-C filter?

Bleeder resistance R_B is placed in parallel with the load so as to maintain a certain minimum current through the choke, even the load resistor gets open-circuited, and improves filtering action.

16. What is meant by voltage regulation of a dc power supply?

The change in voltage from no-load to full-load condition is known as voltage regulation.

17. Why is it necessary to include voltage stabilizer in a power supply?

The magnitude of output dc voltage may vary with the variation of either the input ac voltage or the magnitude of load current. So at the output of a rectifier-filter combination a voltage stabilizer is required.

16MARK

1. Draw the block diagram of an adapter (also called “Regulated Power Supply”) and explain the function of each block.
2. Draw the circuit diagram and explain the working of Half Wave Rectifier (HWR).
3. With the help of a neat circuit diagram explain the working principle of a centre tapped Full Wave Rectifier.
4. Derive expressions for ripple factor (r), rectification efficiency (η) of a Full Wave Rectifier (FWR) and the PIV of the diodes to be used.
5. With the help of a neat circuit diagram explain the operation of a Bridge Rectifier. Also define PIV and find PIV for HWR, Center tapped FWR and Bridge Rectifier.
6. Compare the performance of HWR, Center-tapped FWR and Bridge Rectifier. Mention the advantages and disadvantages of Center-tapped FWR and Bridge rectifiers