UNIT-III
CURRENT SOURCE INVERTERS

1. What is meant by commutation?

It is the process of changing the direction of current flow in a particular path of the circuit. This process is used in thyristors for turning it off.

2. What are the types of commutation?

a. **Natural commutation**
b. **Forced commutation**

3. What is meant by natural commutation?

Here the current flowing through the thyristor goes through a natural zero and enable the thyristor to turn off.

4. What is meant by forced commutation?

In this commutation, the current flowing through the thyristor is forced to become zero by external circuitry.

5. What is meant by voltage commutation?

In this process, a charged capacitor momentarily reverse biases the conducting thyristor and turn it off.

6. What is meant by current commutation?

In this process, a current pulse is made to flow in the reverse direction through the conducting thyristor and when the net thyristor current becomes zero, it is turned off.

7. What is meant by load commutation?

In this process, the load current flowing through the thyristor either becomes zero or is transferred to another device from the conducting thyristor.

8. What is meant by inverter?

A device that converts dc power into ac power at desired output voltage and frequency is called an inverter.

9. What are the applications of an inverter?

a. **Adjustable speed drives**
b. **Induction heating**
c. **Stand-by aircraft power supplies**
d. **UPS**
e. **HVDC transmission**

10. What are the main classifications of inverter?

a. **Voltage Source Inverter**
b. **Current Source Inverter**

11. What is meant a series inverter?

An inverter in which the commutating elements are connected in series with the load is called a series inverter.

12. What is meant a parallel inverter?

An inverter in which the commutating elements are connected in parallel with the load is called a parallel inverter.

13. How is the inverter circuit classified based on commutation circuitry?

a. **Line commutated inverters.**
b. **Load commutated inverters.**
c. **Self commutated inverters.**
d. **Forced commutated inverters.**

14. What is meant by McMurray inverter?

It is an impulse commutated inverter which relies on LC circuit and an auxiliary thyristor for commutation in the load circuit.

15. What is meant by PWM control?

In this method, a fixed dc input voltage is given to the inverter and a controlled ac output voltage is obtained by adjusting the on and off periods of the inverter components. This is the most popular method of controlling the output voltage and this method is termed as PWM control.

16. What are the advantages of PWM control?

a. **The output voltage can be obtained without any additional components.**
b. **Lower order harmonics can be eliminated or minimized along with its output voltage control. As the higher order harmonics can be filtered easily, the filtering requirements are minimized.**

17. Why thyristors are not preferred for inverters?

Thyristors require extra commutation circuits for turn off which results in increased complexity of the circuit. For these reasons thyristors are not preferred for inverters.

18. How output frequency is varied in case of a thyristor?

The output frequency is varied by varying the turn off time of the thyristors in the inverter circuit, i.e. the delay angle of the thyristors is varied.

19. Give two advantages of CSI.

a. **CSI does not require any feedback diodes.**
b. **Commutation circuit is simple as it involves only thyristors.**

20. Why diodes should be connected in antiparallel with the thyristors in inverter circuits?

For RL loads, load current will not be in phase with load voltage and the diodes connected in antiparallel will allow the current to flow when the main thyristors are turned off. These diodes are called feedback diodes.

21. What is meant a series inverter?

An inverter in which the commutating elements are connected in series with the load is called a series inverter.

22. What is meant a parallel inverter?

An inverter in which the commutating elements are connected in parallel with the load is called a parallel inverter.

23. What are the applications of a series inverter?

It is commonly used for fixed output applications such as,

a. **Ultrasonic generator.**
b. **Induction heating.**
c. **Sonar Transmitter**
d. **Fluorescent lighting.**

24. What are the applications of a CSI?

a. **Induction heating**
b. **Lagging VAR compensation**
c. **Speed control of ac motors**
d. **Synchronous motor starting.**

25. Compare CSI and VSI.

S. No.	VSI	CSI
1.	Input voltage is maintained constant	Input current is constant but adjustable
2.	The output voltage does not depend on the load	The output current does not depend on the load
3.	The magnitude of the output current and its waveform depends on the nature of the load impedance	The magnitude of the output voltage and its waveform depends on the nature of the load impedance
4.	It requires feedback diodes	It does not requires feedback diodes
5.	Commutation circuit is complicated i.e. it contains capacitors and inductors.	Commutation circuit is simple i.e. it contains only capacitors.