**EE 2301- POWER ELECTRONICS**

**UNIT – I. POWER SEMICONDUCTOR DEVICES**

**2-MARKS QUSTIONS**

1. How SCR differs from TRIAC?
2. What is snubber circuit?
3. Define spread time?
4. Compare $IGBT $ and MOSFET?
5. Why are $IGBT$ becoming popular in their application to controlled converters?
6. What are the factors that influence the turn – off time of a thyristor?
7. Write the merits and demerits of MOSFET over BJT?
8. Distinguish between holding current and latching current of SCR?
9. What are the drawbacks of GTO?
10. What is meant by pinch-off voltage of MOSFET?
11. What do you mean by controlled switch?
12. What is the need of driver circuit?
13. What losses occur in a thyristor during working conditions?
14. Define circuit turn off time.
15. IGBT and MOSFET is a voltage controlled device. Why?
16. Power BJT is a current controlled device. Why?
17. List the various forced commutation techniques used in to turns off the SCR.
18. What do you mean by load commutation?
19. What are the different methods to turn on the thyristor?
20. Define hard-driving or over-driving.

**UNIT – I. POWER SEMICONDUCTOR DEVICES**

**16 MARKS QUESTIONS**

1. Draw the basic structure and explain the turn – on and turn – off characteristics of IGBT with neat waveforms? (16)
2. (i) What is need of snubber in transistor circuit? Explain the over voltage snubber circuit.

 (8)

(ii) Draw and explain the thyristor gate Drive Circuit. (8)

1. Explain the principle of operation and draw the transfer characteristics of MOSFET? (16)
2. (i) Draw and explain the two transistor model of a SCR? (8)

(ii) Explain the turn off characteristics of a SCR. (8)

1. Explain the switching characteristics of a MOSFET . (16)
2. Explain why TRIAC is rarely operated in I quadrant with negative gate current and in III quadrant with positive gate current. (16)
3. Explain the process of complementary commutation and load commutation with necessary waveforms and equations. (16)
4. Explain the construction and V-I characteristics of SCR. (16)
5. (i) Explain the losses occur in a thyristor during working conditions. (8)

(ii) Explain the transfer characteristics of IGBT. (8)

1. (i) Discuss in detail the switching characteristics of BJT (8)

(ii) Explain the different methods to turn on the thyristor? (8)

**EE2301 POWER ELECTRONICS**

**UNIT-2 PHASE CONTROLLED RECTIFIER**

**2-MARKS QUESTIONS**

1. Define distortion factor?
2. Define Total Harmonic Distortion?
3. Under what conditions a single phase fully controlled converter gets operated as an inverter?
4. When does the line commutated converter act as a line commutated inverter?
5. Give any two differences between single phase full converter and semi converter?
6. Define the term voltage ripple factor?
7. What is meant by Current distortion factor?
8. Why is power factor of semi converter better than full converter?
9. What are the effects of source impedance in the controlled rectifiers?
10. Define displacement factor?
11. Define Firing angle.
12. What is the function of freewheeling diodes in controlled rectifier?
13. What are the advantages of freewheeling diodes in a controlled in a controlled rectifier?
14. What is commutation angle or overlap angle?
15. What are the advantages of six pulse converter?
16. Mention the disadvantages of dual converter with circulating current mode of operation.
17. What do you mean by six pulse converter?
18. Write two applications of dual converter.
19. What is the inversion mode of rectifier?
20. Mention some of the applications of controlled rectifier.

**UNIT-2 PHASE CONTROLLED RECTIFIER**

**16-MARKS QUESTIONS**

1. With necessary circuit and waveforms explain the principle of operation of 6-pulse converter. Derive the expression for average output voltage in it. (16)
2. Describe the operation of a 1Φ two pulse bridge converter with RLE load. (16)
3. Explain the operation of a single phase full bridge converter with RL load for continuous and discontinuous load currents. (16)
4. Explain the effect of source inductance on the performance of 1ɸ fully controlled converter (16)
5. (i) A single phase full converter is supplied from 230V,50HZ source. The load consists of R=10Ω and a large inductance so as to render the load current constant For a firing angle delay of 30▫ .determine:

 a) Average output voltage b) Average output current

 c) Average and rms values of thyristor currents and d)The power factor (8)

(ii) Explain the function of battery charger with neat sketch. (8)

1. Explain how the 3Φ semi converter with neat diagram and waveform. (16)
2. A single phase semi converter is operated from 120V 50HZ ac supply. The load current with an average value Idc is continuous and ripple free firing angle α=$\frac{π}{6}$ determine:

a) Displacement factor b) harmonic factor of input current c) input power factor. (16)

1. Explain the principle of operation of single phase dual converter withneat power circuit diagram. (16)
2. Derive the expressions for harmonic, displacement and power factor of a 1Φ full converter from the fundamental principle. (16)
3. Describe the operation 1Φ full wave midpoint converter with relevant voltage and current waveform. (16)