

POWER ELECTRONICS AND INDUSTRIAL CONTROL

(Sub Code: Theory - 1)

Full Marks: 80

Time: 3 hours

Answer any **FIVE** Questions

The figures in the right-hand margin indicate marks

1. (a) Define reliability of SCR and Mean Time Between Failure (MTBF). [2]
(b) Explain principle of operation of step-up chopper with resistive load and proper diagram and draw its waveform. [6]
(c) Explain the operation, construction of SCR and draw its V-I characteristics curve. [8]
2. (a) What is the basic difference between firing angle & extinction angle of controlled rectifier? [2]
(b) Define commutation and explain briefly about different TURN ON methods of SCR. [6]
(c) Explain briefly about R-C firing of SCR. [8]
3. (a) Differentiate between DIAC and TRIAC. [2]
(b) Discuss about the operation of power BJT. [6]
(c) Describe about different chopper configurations (class A, B, C & D,) with neat diagrams. [8]
4. (a) What are the disadvantages of Cycloconverter? [2]
(b) Draw the schematic diagram of linear power supply that provides +5V or -5V and explain its operation. [6]
(c) Explain the operation of single-phase full bridge inverter with schematic diagram. [7]
5. (a) What do you mean by duty cycle? [2]
(b) Explain the operation with diagram of a single phase to single phase Cycloconverter with resistive type load. [6]
(c) Explain the operation, construction of GTO and draw its characteristics curve. [8]
6. (a) Differentiate between ONLINE UPS and OFFLINE UPS system. [2]
(b) Explain the two transistor of SCR. [6]
(c) Draw schematic diagram of linear power supply that provides +15V or -5V using IC LM 317 and explain its operation. [8]
7. (a) What are the methods to protect a SCR? [2]
(b) Explain with schematic diagram and waveform the operation of a single phase fully controlled bridge converter with resistive load. [6]
(c) Write short notes on way **TWO**: [4×2=8]
 - (i) Smoke detector circuit
 - (ii) Switch mode power supply (SMPS)
 - (iii) Snubber circuit
 - (iv) Uninterruptable power supply (UPS)