

# AMI19 POWER ELECTRONICS

## UNIT-1 INTRODUCTION

- 1.1 Characteristics and switching behaviour of Power Diode, SCR, UJT, TRIAC, DIAC, GTO,
- 1.2 MOSFET, IGBT, MCT and power BJT, two-transistor analogy of SCR, firing circuits of SCR and TRIAC, SCR gate characteristics, SCR ratings.
- 1.3 Protection of SCR against over current, over voltage, high  $dV/dt$ , high  $dI/dt$ , thermal protection, Snubber circuits,
- 1.4 Methods of commutation, series and parallel operation of SCR, Driver circuits for BJT/MOSFET.

## UNIT-2 A.C. TO D.C. CONVERTER

- 2.1 Classification of rectifiers, phase controlled rectifiers, fully controlled and half controlled rectifiers and their performance parameters,
- 2.2 Three phase half wave, full wave and half controlled rectifiers and their performance parameters,
- 2.3 Effect of source impedance on the performance of single phase and three phase controlled rectifiers, single-phase and three phase dual converter.

## UNIT-3 D.C. TO D.C. CONVERTER

- 3.1 Classification of choppers as type A, B, C, D and E, principle of operation, switching mode regulators:
- 3.2 Buck, Boost, Buck-Boost, Cuk regulators. A.C. to A.C. Converter:
- 3.3 AC voltage Controllers, Cyclo-converters : single phase to single phase, three phase to single phase, three phase to three phase Cycloconverter circuit and their operation,
- 3.4 Matrix converter.

## UNIT-4 D.C. TO A.C. CONVERTER

- 4.1 Single phase single pulse inverter: Square wave, quasi square.
- 4.2 Three phase single pulse inverters ( $120^\circ$  and  $180^\circ$  conduction) Modulation Techniques and reduction of harmonics,
- 4.3 PWM techniques, SPWM techniques, SVM, Carrier less modulation. ,
- 4.4 PWM Inverter, Bidirectional PWM converters, voltage source inverters and current source inverter,
- 4.5 Multi-level Inverter: cascaded and NPC Inverters.

## References Books:

1. Singh, Kanchandani, "Power Electronics", Tata McGraw-Hill.
2. Ned Mohan, Tore M. Undeland and Robbins, "Power Electronics: Converters, Applications and