AMICE19 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˚and 180˚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