Subject Code : P8IE7

POWER ELECTRONICS

UNIT – I : Theory and Operation of SCR, UJT, and TRIAC:

Characteristics – design of relaxation oscillator using UJT – UJT in SCR and TRIAC triggering circuits – PUTs – silicon bilateral switch – speed control of DC shunt Motor using thyristors – single phase half wave speed control system – Single – phase speed control system – Reversible control system.

UNIT – II : Thyristor Communication Techniques:

Introduction – natural commutation – forced commutation – self commutation – impulse commutation – response pulse commutation – external pulse commutation – load side commutation – line side commutation – complementary commutation, single phase semi-converter – single phase series converter.

UNIT – III : Static Switches:

Introduction – single phase AC switches, three phase AC switches – Three phase reversing switches – AC switches for bus transfer – DC switches – Solid – state relays – AC voltage controller: Introduction – Principle of ON/OFF control – Principle of phase control – single phase bi-directional controllers with resistive loads and inductive loads – cycle converters –single phase cycle converters.

UNIT – IV : DC Choppers

Introduction – principle of step-down operation – step-down with RL load – Principle of step up operation – Switch mode regulator: buck regulator – boost regulator – Buck and Boost regulator – CUK regulator.

UNIT – V : Invertors and Power Supplies:

Introduction – Principle of operation – single phase bridge inverters – three phase inverters – Voltage control of single phase inverters – Introduction to power supply – AC and DC power supply – Switched mode DC power supplies – Resonant DC power supplies – Bi-directional power supplies – AC power supplies.

Books for Reference:

1. Power Electronics Circuits Devices & Applications, M.R.Rashid - Prentice Hall.
2. Power Electronics – Sen.