Subject Code : P8EL4

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-PUT's - 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. Controller Rectifiers:- Introduction-Principle of phase controlled converter – 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 – Principles 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.

REFERENCE BOOKS:

1. POWER ELECTRONICS: CIRCUITS, DEVICES & APPLICATIONS- M.H. RASHID-PRENTICE HALL
2. POWER ELECTRONICS – SEN