

Power Electronics and Drives

B.E. Sem. VII [ETRX]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	25
Term Work	–	25

Objective : To teach the applications of power electronics devices. Also to study Industrial Drives.

Pre-requisite : Power Semiconductor devices, AC and DC machines

SYLLABUS

1. Phase Controlled Converter

Single phase bridge converter with effect of source impedance. Dual converter.

2. Chopper

Principle of chopper operation, step-up and step-down, one quadrant, two quadrant chopper (Type A and B). Thyristorised chopper circuits

- (a) Voltage commutated chopper
- (b) Current commutated chopper
- (c) Load commutated chopper

3. Inverter

Classification of inverter , Analysis & Design:

- (a) Series , Parallel and bridge (Mc Murray)
- (b) Voltage and current source inverter
- (c) PWM inverter

Different methods for harmonic reduction in inverter output.

4. DC Drives

Concept of DC electric drive with respect to speed control. Single phase, half wave semi converter, full converter drive for separately excited dc motor. Dynamic and regenerative braking of DC motor. Methods used to adjust following parameters of a typical dc drive.

- (a) Speed, (b) IR compensation, (c) current limit, (d) acceleration/de-acceleration

5. AC Drives

Induction motor fundamentals and speed control methods

- (a) Stator voltage, (b) Variable frequency, (c) Rotor resistance, (d) Slip energy recovery scheme

Drives related to V/F control and slip power recovery scheme.

6. Applications

SMPS and UPS:- Analysis of fly back, forward and half bridge converters for SMPS. Block diagram and configuration of UPS, salient features, selection of battery and charger ratings and sizing of UPS.

References :

1. General Electric : SCR manual, USA.
2. Power electronics (*M.H. Rashid*) PHI India.
3. Power electronics (*M.D. Singh and K.B. Khanchandani*) Tata McGraw Hill
4. Power Electronics (*Dr. P.S. Bimbhra*) Khanna Publications.
5. Power electronics and motor control (*Shepherd, Hulley, Liang*) Second edition, Cambridge
6. Electronics in Industry (*Chute and Chute*) MGH
7. Power Electronics (*B.W. Williams*) Jhon Willey, 1975.
8. Power Electronics (*P.C. Sen*) TMH.

