

CONTENTS

1 : INTRODUCTION TO POWER ELECTRONICS

- Power Electronics Converters
- Operation of Converters
- Applications of converters
- Applications of Power Electronics
- Review Question

2 : POWER SEMICONDUCTOR DEVICES

- Introduction
- Power Transistors
- Silicon Controlled Rectifier (SCR)
- Static Characteristics of Thyristor
- Gate-Turn-off thyristors
- Power MOSFET (Metal oxide Semiconductor Field effect Transistor)
- TRIAC
- Insulated Gate Bipolar Transistor (IGBT)
- MOS Controlled Thyristor (MCT)
- Unijunction Transistor (UJT)
- Solved Examples
- Review Question
- Objective Questions
- Problems

3 : THYRISTORS

- Introduction
- Thyristor Static Characteristics
- Turn-on methods of thyristor
- Switching Characteristics of Thyristors

- Gate Characteristics
- Thyristor Ratings
- Thyristor Protection
- Gate Protection
- Over Current Protection
- Thyristor Mounting Techniques
- Series and Parallel Operation of Thyristors
- Solved Examples
- Objective Questions
- Review Questions

4 : UNCONTROLLED AND CONTROLLED RECTIFIERS

- Introduction
- Basic Diode Rectifiers
- Three Phase Full Bridge Rectifier
- Line Frequency Phase Controlled Rectifiers
- Single Phase Full Wave Converters
- Three Phase Full wave Controlled Converters
- Effect of Source Inductance on Single Phase Converter
- Effect of the Source Inductance on 3- ϕ Converter
- Dual Converters
- Dual Converter with Circulating Current
- Solved Examples
- Review Questions
- Problems

5 : THYRISTOR COMMUTATION TECHNIQUES

- Introduction
- Load Commutation (Resonant Turn off)
- Resonant Pulse Commutation
- Complementary Commutation
- Impulse Commutation
- Line Commutation
- Solved Examples
- Objective Questions
- Review Questions

6 : CHOPPERS

- Introduction
- Basic Principle of Chopper Operation
- Duty Cycle Controlling Schemes
- Step up (Boost) Chopper

- Analysis of Step-up Chopper
- Classification of Chopper Circuit
- Thyristor Chopper Circuit
- Voltage Commutated Chopper
- Current Commutated Chopper
- Solved Example
- Objective Questions
- Review Questions
- Problems

7 : INVERTERS

- Introduction
- Performance of Inverters
- Single-Phase Bridge inverters
- Three Phase Inverter
- Mc Murray Half-Bridge Inverter
- Current Source Inverters
- Voltage Control of Single Phase inverters
- Reduction of Harmonics
- Solved Examples
- Objectives Questions
- Review Questions
- Problems

8 : AC VOLTAGE CONTROLLERS

- Introduction
- Principle of Operation of ON-OFF Control
- Principle of Operation of Phase Control
- Single Phase Bidirectional Controllers
- Three Phase Full Wave Controllers
- Cyclo Converters
- Solved Examples
- Objective Questions
- Review Questions

9 : ELECTRIC DRIVES

- Introduction
- Multiquadrant Operation of Motors
- Classification of Load Torques
- Speed Control of dc Motors
- Braking
- Solid State Speed Control of Separately excited Mo

- Solid State Control of dc Series Motor
- Chopper-controlled dc Motor
- Solid State Speed Control of Induction Motor
- Solved Examples
- Objective Questions
- Review Questions
- Problem

10 : APPLICATION OF POWER ELECTRONICS

- Brief Introduction o Classical HVDC and HVDC Light
- Easy Introduction to Classical HVDC and HVDC Light
- HVDC/HVDC Light Converter Stations
- Applications for HVDC Light
- Interconnection of Different Grids (USA)
- Overhead Transmission Lines for HVDC
- Applications
- Condition Assessment
- High and Medium voltage
- Components
- Device Selection Criteria
- Cost, Reliability, Frequency and Efficiency
- Thyristors and Transistors s
- Trends and Improvements
- Switched Mode Power Supplies (SMPs)

APPENDIX A : SESSIONAL TEST PAPER

APPENDIX B : UNIT WISE TUTORIAL SHEETS

APPENDIX C : QUIZ TESTS

APPENDIX D : VIVA VOCE QUESTIOSN BASED ON ELECTRIC DRIVES

APPENDIX E : SOME IMPORTANT QUESTIONS

APPENDIX F : (UPTU EXAMINATION PAPAR)

APPENDIX G : (JAMIA EXAMINATION PAPERS)

APPENDIX H : INDEX