

TOPIC-01- POWER ELECTRONICS:

- 1) With neat block diagram explain the power electronic system. Write any two areas deals with power electronics.
- 2) With neat diagram explain the construction of power BJT.
- 3) With neat diagram explain the V-I characteristics of power BJT.
- 4) With neat diagram explain the construction of power MOSFET.
- 5) With neat diagram explain the V-I characteristics of power MOSFET.
- 6) With neat diagram explain the construction of IGBT.
- 7) With neat diagram explain the V-I characteristics of IGBT.
- 8) Explain the various losses in power devices.
- 9) Draw the symbols for: (i) Power BJT (ii) Power MOSFET (iii) IGBT.
- 10) Give the advantages and applications of (i) Power BJT (ii) Power MOSFET (iii) IGBT. Also write its maximum frequency of operation.

TOPIC-02- TYRISTOR FAMILY DEVICES:

- 1) Draw the symbols for the following thyristor family devices:
(a) SCR (b) DIAC (c) TRIAC (d) LASCR
(e) SCS (f) SBS (g) PUT.
- 2) Draw the structure of SCR. Explain its working.
- 3) With suitable diagram explain the V-I characteristics of SCR.
- 4) Describe the two transistor analogy of SCR.
- 5) Write any four advantages and disadvantages of SCR (4 for each).
- 6) Draw the constructional details of TRIAC and explain it.
- 7) Draw and explain the V-I characteristics of TRIAC.
- 8) Compare GTO and IGBT with respect to its:
(a) Basic construction (c) Working principle
(b) Rating and characteristics (d) Applications
- 9) Explain the construction and working of GTO.
- 10) Write the advantages and applications of GTO (any 4 for each).
- 11) Sketch the characteristics of SCS. Also write its applications.
- 12) Draw the symbol and construction of LASCR. Draw its characteristics.
- 13) Draw the characteristics of SUS.
- 14) Draw the constructional diagram and V-I characteristics of DIAC.
- 15) Draw construction of UJT and explain its working.
- 16) Draw and explain the V-I characteristics of UJT.
- 17) Compare: (a) SCR and TRIAC (b) DIAC and TRIAC (c) UJT and PUT (d) GTO and IGBT.

TOPIC-03- TURN ON AND TURN OFF METHODS OF SCR:

- 1) List the various methods of turning SCR on. Explain any two of them in brief.
- 2) What are the necessary conditions to turn ON the SCR? Define firing angle and conduction angle.
- 3) State the importance of pulse triggering.
- 4) Explain the R- triggering circuit for SCR. Draw the necessary waveforms.
- 5) Draw the RC triggering circuit of SCR and explain its operation. Draw waveforms.
- 6) Draw the circuit diagram for UJT relaxation oscillator.
- 7) Explain the concept of pulse transformer with neat diagram.
- 8) With neat circuit diagram and waveforms explain PUT relaxation oscillator.
- 9) Define commutation. List all the methods of commutation.
- 10) Compare natural commutation and forced commutation.
- 11) Draw the circuit for class-A commutation. Explain its working. Draw necessary waveforms.
- 12) Draw the circuit for class-B commutation. Explain its working. Draw necessary waveforms.
- 13) Draw the circuit for class-C commutation. Explain its working. Draw necessary waveforms.

TOPIC-04- PHASE CONTROLLED RECTIFIER:

- 1) With neat circuit diagram and waveforms explain the working of 1ϕ HWCR with RL- load.
- 2) Explain the use of freewheeling diode in controlled rectifiers.
- 3) Define the term semi converter. Draw and explain the circuit diagram of 1ϕ FWCR with RL- load.
- 4) Draw and explain the circuit diagram of 1ϕ FWCR with R- load.
- 5) Draw and explain the circuit diagram of 1ϕ FWCR (M_2 configuration) with R- load.
- 6) Draw and explain the circuit diagram of 1ϕ FWCR (M_2 configuration) with RL- load.
- 7) Draw and explain the circuit diagram of 1ϕ FWCR (Bridge configuration) with R- load.
- 8) Draw and explain the circuit diagram of 1ϕ FWCR (Bridge configuration) with RL- load.
- 9) Explain the applications of controlled rectifiers. (1ϕ and 3ϕ rectifiers)
- 10) Define and explain the term: Poly phase rectifier. Explain its necessity. Draw the circuit diagram for 3ϕ HWCR with delta- star connection.

TOPIC-05- CONVERTER:

- 1) Define chopper and inverter?
- 2) Classify the choppers. Explain step up or step down chopper. (Any one chopper).
- 3) Give the applications of choppers and inverters.
- 4) Compare step up and step down chopper.
- 5) Classify the inverters. Draw a neat circuit diagram of series inverter.
- 6) Define the performance parameters of inverter.
 - (a) Harmonic Factor of n^{th} Harmonic (HF $_n$)
 - (b) Total Harmonic Distortion (THD)
 - (c) Distortion Factor (DF)
 - (d) Lowest Order Harmonic (LOH)

TOPIC-06- INDUSTRIAL CONTROL CIRCUIT:

- 1) Explain the D.C. delay timers using SCR with neat circuit diagram.
- 2) Explain the Low power D.C. flasher using SCR with neat circuit diagram.
- 3) Explain the Light dimmers using DIAC-TRIAC with neat circuit diagram.
- 4) Explain the Battery charger using SCR with neat circuit diagram.
- 5) Explain the Emergency lighting system using SCR with neat circuit diagram.
- 6) Explain the Temperature controller using SCR with neat circuit diagram.
- 7) Explain Speed control of fan using TRIAC with neat circuit diagram.
- 8) With neat block diagram explain the concept of UPS.
- 9) With neat block diagram explain the concept of SMPS.