

REVISED COURSE
(3 Hours)

Total Marks: 80

N. B. 1) Question No. 1 is compulsory.

2) Attempt any three questions out of the remaining five questions.

3) Figures to the right indicate full marks.

4) Assume suitable data wherever required but justify the same.

- Q1 Answer any four** 20
- a) Compare the various triggering methods of thyristors.
 - b) What is the need of freewheeling diode in rectifiers? Explain with an example.
 - c) Draw and explain VI characteristic of TRIAC.
 - d) Explain the commutation techniques for SCR. Draw any one, forced commutation circuit.
 - e) Explain various control strategies for DC-DC converter.
- Q2 a)** Draw and explain single phase fully controlled converter with RL load .Draw load current, load voltage input voltage and gating signal for $\alpha = 60^\circ$. 10
- b)** Explain the working of three phase bridge inverter in 180 degree conduction mode with circuit diagram and waveforms. 10
- Q3 a)** A single phase full bridge inverter has a resistive load of 10Ω and dc input voltage of 48 V. 10
- Calculate :
- i) RMS output voltage V_{rms}
 - ii) RMS output voltage at fundamental frequency $V(01)_{rms}$
 - iii) Total Harmonic Distortion (THD)
 - iv) Average and peak current of each thyristor
- b)** Explain working principle of single phase cyclo converter with circuit diagram and waveforms. 10
- Q4. a)** A single phase fully controlled converter is operated from 230V, 50Hz ac supply. The load resistance is 10 Ohms. The average output voltage is 10% of max possible average output voltage. 10
- Calculate:-
- i) Firing angle
 - ii) RMS and Average output current
 - iii) Efficiency
 - iv) Displacement Factor (DF)
- b)** Draw and explain the working of 3Φ fully controlled rectifier with neat circuit diagram and Waveforms. 10
- Q5. a)** Draw and explain AC voltage control circuit using DIAC and TRIAC .Draw the waveforms with- 10
- $\alpha = 45^\circ$.
- b)** Draw and explain Boost converter with waveforms. Also derive the expression for output voltage. 10
- Q6. Write short notes on (Any three)** 20
- a) Compare IGBT, MOSFET and GTO.
 - b) Protection circuits for SCR.
 - c) Driver circuits for power transistors.
 - d) Voltage control of inverters using PWM techniques.
-