

- c. Explain briefly external pulse commutation with necessary circuit diagram and waveform. (06 Marks)
- 5 a. With the help of suitable circuit diagrams explain the operation of single phase Ac regulator using phase control and ON-OFF control. (08 Marks)
- b. With the help of a neat circuit diagram and waveforms explain its operation of a bi-directional controller with resistive load. Derive the necessary equations for $V_o(\text{rms})$. (08 Marks)
- c. In an ON-OFF control circuit using 1 ϕ , 230 V, 50 Hz supply the ON time is 10 cycles and OFF time is 4 cycles. Calculate the RMS value of the output voltage. (04 Marks)
- 6 a. Explain the working of a 1 ϕ , fully controlled converter with inductive load with the help of a neat circuit diagrams and waveforms and hence derive the equation for the $V_o(\text{av})$ and $V_o(\text{rms})$. Assume continuous conduction. (10 Marks)
- b. A 3 ϕ half wave converter is operated from a 3 ϕ star connected 208V, 60Hz supply and the load resistance is $R = 10\Omega$. If it is required to obtain an average output voltage of 50% of the maximum possible output voltage, calculate.
- Delay angle
 - rms and average o/p currents
 - Average and rms thyristor currents
 - Rectification Efficiency
 - TUF
 - Input power factor. (10 Marks)
- 7 a. Explain the basic principle of a step down chopper and write down the expressions for
- Average output voltage
 - Output power, and
 - Effective input resistance in terms of the chopper duty cycle. (08 Marks)
- b. A step up DC chopper has an input of 200 volts and an output of 250 volts. The blocking period in each cycle of operation is 0.6×10^{-3} seconds. Find the period of conduction in each cycle. Derive the equation for $V_o(\text{av})$. (06 Marks)
- c. Briefly give the classification of choppers. (06 Marks)
- 8 a. Derive an expression for rms value of output voltage for half bridge inverter having square wave output. Assume the peak value of the output as $\frac{V_s}{2}$. (06 Marks)
- b. Explain the operation of a 1 ϕ full bridge inverter. Derive the necessary equation for rms value of the output voltage. Draw the relevant waveforms. (10 Marks)
- c. Explain the application of an inverter in UPS. (04 Marks)
