

2053
B.E. (Electrical and Electronics Engineering)
Sixth Semester
EE-606: Power Electronics

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting one question from each Section.

- x-x-x
- 1
- (a) What is the necessity of using a series converter?
 - (b) Discuss briefly about the advantages of freewheeling diode.
 - (c) Why should a current source inverter have a large inductance in series with the source?
 - (d) What are the applications of Inverters?
 - (e) Why should thyristors operating in parallel preferably have a common heat sink?
 - (f) What are the drawbacks of a series inverter?
 - (g) What is the effect of source inductance on converter operation?
 - (h) Why does a chopper need forced commutation?
 - (i) Name the performance characteristics of a rectifier.
 - (j) How can the drawbacks of a series inverter be removed? (1*10= 10)

Section A

- 2
- (a) Define string efficiency for series/parallel connected SCRs.
 - (b) Discuss, with relevant waveform, class A type of commutations employed for thyristors. (5+5=10)
- 3
- A single-phase flying capacitors cascaded multilevel inverter has $m=5$. Find the number of capacitors, the peak voltage and current ratings of diodes and switching devices if $V_{dc} = 5$ kV. (10)
- 4
- Explain with the help of proper diagrams the function of a three-phase full-wave fully controlled bridge inverter for 120° conduction. (10)

Section B

- 5
- Single phase fully controlled converter is connected to a load consisting of 2 ohms resistance and 0.3H inductance. The supply voltage is 230V at 50Hz. Estimate the average load voltage, average load current and input power factor for a firing angle of 200° . Assume continuous and ripple free load current. (10)
- 6
- Explain the working of the current commutated chopper with aid of circuit diagram and necessary waveforms. Derive the expression for the commutating inductor and capacitor. (10)
- 7
- Describe the basic principle of working of a single-phase to single-phase step down cycloconverter for both continuous and discontinuous conduction for a bridge type cycloconverter. (10)