

Registration No :

--	--	--	--	--	--	--	--	--	--

Total Number of Pages : 02

B.Tech
PEE51101

5th Semester Regular / Back Examination 2018-19

**POWER ELECTRONICS
BRANCH : ELECTRICAL**

Time : 3 Hours

Max Marks : 100

Q.CODE : E300

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1 Short Answer Type Questions (Answer All-10) (2 x 10)

- Why circuit turn-off time is usually greater than thyristor turn off time ?
- What do you mean by latching current and holding current of a thyristor in operation.
- What is the electrical analogue of heat transfer from a power semiconductor device ?
- Can a power device be protected by a fuse? Justify.
- Single-phase converters are avoided in high performance applications. Why?
- What do you mean by AC link chopper? Draw the block diagram.
- The input voltage of a chopper is 220V, load voltage is 150V and the chopping frequency is 4Hz. Find the ON and OFF period of the thyristor in each cycle.
- What is the purpose of a converter in dc drives?
- How is the delay angle of one converter related to the delay angle of the other converter in a dual-converter system?
- What are the methods to vary the inverter output voltage? Write down some applications of inverter?

Part-II

Q2 Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- Discuss the need of Snubber circuit and a series inductor for thyristor? Explain with clear circuit diagram.
- Explain the cosine waveform is used for designing a firing circuit?
- Enumerate the control circuit design for a two-quadrant chopper circuit.
- Derive the average output DC voltage for a single-phase controlled-bridge converter with both continuous and discontinuous current mode operations with relevant waveform.
- Derive the expression for the average output voltage for a three phase, 3-pulse and three phase, 6-pulse diode rectifier using cosine form.
- Ripple current is minimized by either increasing the chopper frequency or including an inductance in series with the armature of the dc motor. Discuss the merits and demerits of each alternative.
- What are the advantages of pulse width modulation? Describe the technique of technique of single pulse-width modulation with the expression for modulation index.
- How is SCR different from GTO? What are the merits and demerits of GTO?
- Draw and explain the current-voltage characteristic of a GTO thyristor switch and how it differs from an ordinary three wire thyristor switch ?
- Draw the circuit and explain the modified single phase series inverter with advantages and disadvantages.
- Draw the waveform of source voltage, source current, load voltage and load current of single phase full controlled converter for discontinuous load current with R-L load.