D 90151 (Pages 2)

Name.....

Reg. No.....

FIFTH SEMESTER B.TECH. (ENGINEERING) [09 SCHEME] DEGREE EXAMINATION, NOVEMBER 2015

EE/PTEE 09 504—POWER ELECTRONICS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. Why are IGBT becoming popular in their application to controlled converters ?
2. What is the inversion mode of controlled rectifiers ?
3. List various applications of phase controlled converters.
4. What is two quadrant DC chopper ?
5. Define : duty cycle of d.c. chopper.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Explain the principle of operation of DIAC.
7. Explain the turn off characteristics of SCR.
8. For a single-phase Ac voltage controller feeding a R load draw the waveforms of source voltage, output voltage, source and output current.
9. The single-phase half bridge inverter has a resistive load of 2.4 Ω and the d.c. input voltage is 48 V. determine the r.m.s output voltage at the fundamental frequency, output power and the total harmonic distortion ?
10. For a type A chopper (first quadrant), express the following variable as a function of V_s, R and duty cycle δ in case the load is resistive.
11. Explain how the switching regulator is differ from linear regulator.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

12. (a) Discuss the transfer, output and switching characteristics of IGBT.

Or

(b) Discuss the operation of power MOSFET and explain the transfer, output and switching characteristics of power MOSFET.

Turn over

13. (a) Discuss the operation of three-phase half controlled rectifier with R load. Also draw the output wave forms.

Or

(b) Discuss the working of three-phase 180 degree mode operation of inverter with neat sketch and wave forms.

14. (a) Explain with neat diagram and wave forms the four quadrant operation of a chopper with motor load.

Or

(b) With necessary circuit and waveforms, explain the principle of operation of single-phase to single phase cyclo converter (step up)feeding R load.

15. (a) Draw the circuit diagram of a cuk regulator and explain its operation with equivalent circuit for different modes and waveforms.

Or

(b) Explain with neat circuit diagram and wave forms the working of pushpull converter.

(4 × 10 = 40 marks)