Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 41005

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Fifth Semester

Electrical and Electronics Engineering

EE 6503 – POWER ELECTRONICS

(Common to : Electronics and Instrumentation Engineering/Instrumentation and Control Engineering/Mechatronics Engineering)

(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

PART – A (10×2=20 Marks)

1. What is meant by commutation of a SCR ?
2. Mention the advantages of 'RC' triggering over 'R' triggering.
3. List out the differences between full and semi converter.
4. Give the applications of fly wheel diode in a full converter.
5. What is meant by 'current limit control' of a chopper ?
6. What is a resonant converter ?
7. What is meant by 'space vector modulation' ?
8. Differentiate CSI over VSI.
9. List out the applications of AC voltage controller.
10. Mention the advantages of matrix converter over conventional converter.

PART – B (5×13=65 Marks)

11. a) Explain the working of a current commutation technique. (13)

(OR)

b) Describe the UJT triggering circuit with neat sketch. (13)

12. a) Discuss the operation of a 3 phase semi converter with 'R' load and also draw the output voltage waveforms for 30° and 90°. (13)

(OR)

b) Explain the working of single phase full converter for 'RL' load discontinuous mode of operation with neat sketch and waveforms. (13)

13. a) With neat sketch and output voltage waveforms explain the working of a boost converter. (13)

(OR)

b) Describe the voltage commutated chopper with neat sketch. (13)

14. a) Discuss the working of a 3 phase inverter in 120° conduction mode. (13)

(OR)

b) Explain the SPWM and modified SPWM techniques for inverter switching. (13)

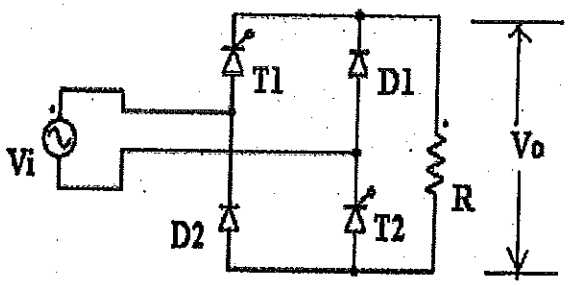
15. a) Explain the operation of a multi stage sequential control in single phase AC voltage controller. (13)

(OR)

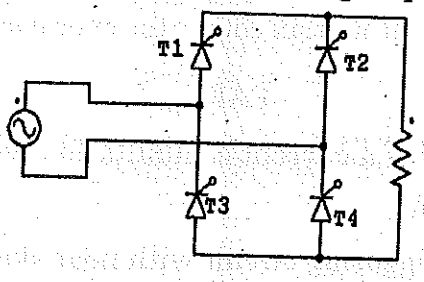
b) Explain the operation of a three phase to three phase cyclo converter. (13)

PART – C (1×15=15 Marks)

16. a) i) Explain the working of the following circuits. Draw and find out the expression for output voltage. (8)



ii) In this single phase full converter T1 and T4 are given pulses at every 'α'. T2 and T3 are given pulses at every 'α + 180'. Unknowingly the gate pulses of T2 and T3 are removed and was given by the pulses of T1 and T2. Now explain, draw and derive the output voltage equation. (7)



(OR)

b) i) A single phase full converter is connected to 'R' load. The source voltage is of 230 V, 50 Hz. The average load current is of 20 A. For R = 10 Ω, find the firing angle and also find the RMS output voltage. (8)

ii) A 2 kW, 400 V resistive load is connected to a three phase semi converter. The input to the converter is 400 V, 50 Hz. Find the load average voltage and current when the load consumes 1000 watts. (7)