PVP 14

Code: EE5T4

III B.Tech - I Semester – Regular/Supplementary Examinations
October 2018

POWER ELECTRONICS
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11 x 2 = 22 M

1.

a) Define turn-on time and turn –off time of a thyristor.
b) Draw the two transistor analogy of a Thyristor.
c) What are static and Dynamic equalizing circuits?
d) What is meant by forced commutation?
e) What is a Dual converter?
f) Draw a basic series inverter circuit.
g) Illustrate the advantages of using three phase converters over single phase converters.
h) Explain Time Ratio Control for a Chopper circuit.
i) Draw a Jones Chopper circuit.
j) Write the expression for the output voltage in a three phase fully controlled converter.
k) What is a step down cyclo converter?

PART – B

Answer any *THREE* questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Explain the I-V characteristics of an SCR with a neat diagram. 8 M

   b) With neat circuit diagram and waveforms explain Synchronised UJT triggering circuit. 8 M

3. a) Explain the operation of a single phase fully controlled converter feeding an resistive and inductive load with neat waveforms. 8 M

   b) A three phase fully-controlled bridge converter is connected to 415 V supply, having a reactance of 0.3 Ω/phase and resistance of 0.05Ω /phase. The converter is working on the inversion-mode at a firing advance angle of 35^0. Compute the average generator voltage. Assume Id = 60A and thyristor drop of 1.5 V. 8 M

4. a) Explain the operation of a single phase full bridge inverter Circuit. 8 M

   b) Explain the various methods of PWM voltage control of an Inverter. 8 M

5. a) Explain the operation of a Buck-Boost Chopper circuit with neat waveforms. 8 M

b) A dc chopper circuit connected to a 100 V dc supplies an inductive load having 100 mH with a resistance of 5 Ω. A freewheeling diode is placed across the load. The load current varies between the limits of 10 A and 12 A. Determine the time ratio of the chopper. 8 M

6. a) With neat circuit diagram and relevant waveforms explain Single Phase AC voltage controller with Inductive load. 8 M

b) Draw a single phase Step down Cycloconverter with Inductive load and explain its operation. 8 M