2062
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, selecting atleast two questions from each Section.*

x-x-x

Section A

1) Explain with the help of proper diagram the structure and characteristics of MOSFETS.
(10)

2) (a) Discuss, with relevant waveform of class D types of commutations employed for thyristors.
(5)

(b) Explain the working principle and V-I characteristics of a Triac.
(5)

3) (a) Compare GTO, PUT, SCS and RCT in detail.
(5)

(b) Explain with the help of proper diagrams the working principle of three-phase dual converter for its operation in non-circulating current mode
(5)

4) A 3 phase fully controlled bridge converter with 415 V supply, 0.04 Ω resistance per phase and 0.25 Ω reactance per phase is operating in the inverting mode at a firing angle of 35°. Calculate the mean generator voltage when the current is at a level of 80A. The thyristor voltage drop is 1.5 V.
(10)

Section B

5) Explain the working of current commutated chopper with aid of circuit diagram and necessary waveforms. Derive the expression for the commutating inductor and capacitor. (10)

6) Explain with the help of proper diagrams the function of a three-phase full-wave fully controlled bridge inverter for 180° conductions.
(10)

7) Describe the basic principle of working of a three-phase to single-phase Cycloconverter. (10)

8) A three phase to single phase cycloconverter employs 3 pulse positive and negative group converters. Each converter is supplied from delta/star transformer with per phase turns ratio of 2:1. The supply voltage is 400 V, 50 Hz. The RL load has R = 2 ohm and at low output frequency, $\omega_0 L$ = 1.5 ohm. In order to account for commutation overlap and thyristor turn off time, the firing angle in the inversion mode should not exceed 160°. Compute (a) the value of the fundamental rms output voltage (b) rms output current (c) output power.
(10)

x-x-x