Exam. Code: 0936
Sub. Code: 6640

2023

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, including Question No. I which is compulsory and selecting two questions from each Section.*

x-x-x

1 (a)What is the necessity of using series converter?

(b) Name the performance characteristics of a rectifier.

(c) What are the drawbacks of a series inverter?

(d) Why should a current source inverter have a large inductance in series with the source?

(e) How can the drawbacks of a series inverter be removed??

(f) Why is freewheeling diode used in rectifier circuit?

(g) What is the necessity of using series converter?

(h) Name the two methods of speed control of dc motors.

(i) Name the methods of speed control of 3 phase induction motors.

(j) What is regenerative braking? (1*10= 10)

Section A

2 Draw the working of a single phase full wave controller converter. In what respects is the operation of this circuit different for resistance load, R-L load and RLE load? (10)

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

4 A single-phase flying capcitors cascaded multilevel inverter has m=5. Find the number of capacitors, the peak voltage and current ratings of diodes and switching devices if V_{dc} = 5 kV. (10)

Section B

5 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)

6 (i) What is the principle of closed-loop control of dc drives. Also state its various advantages. (5)

(ii) Why are dc series motors mostly used in traction applications? Which are the parameters to be varied for speed control of dc series motors? (5)

7 Explain with the help of proper diagram the scheme of a μP/μC based speed control of a dc shunt motor. (10)

x-x-x