Exam. Code: 0937
Sub. Code: 33783

2076

B.E. (Electrical and Electronics Engineering)
Seventh Semester
PC-EE-701: Power Electronics and Drives

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.

x-x-x

Q1. Explain in brief.

a) Why thyristors are not preferred in inverters? **(02)**

b) What is the second order differential equations of output voltage of full-bridge inverter for RLC load for $0 < t < T/2$ and $T/2 < t < T$? **(02)**

c) Write the equation for governing the speed of a induction machine. Also write the various methods of its speed control. **(02)**

d) Only draw the circuit diagram for single-phase to single-phase mid-point cycloconverter with proper nomenclature. **(02)**

e) Write down the rms value of output voltage equation for single-phase half-wave AC voltage controller in integral form. **(02)**

PART - A

Q2. Draw the circuit-diagram for a two-stage sequence control AC voltage controller with resistive load. Draw output wave-shapes of voltage and current. Also develop the output voltage expression in rms form. **(02,03, 02,03)**

Q3.a) Explain the working of a three-phase 180° mode voltage source inverter with a star-connected resistive load. Show the conduction of various thyristors and draw its output line and phase voltages. **(07)**

b) A single phase inverter fed from a 100 V dc, is connected to load R=6 ohms and L=0.04 H. Determine the rms value of resultant load current up to third harmonic in case the inverter is operating at 50 Hz with a square wave output. **(03)**

P.T.O.

Q4. Write short notes on: **(05)**

a) Flying capcitor Multilevel Inverter (MLI)

b) H-bridge cascaded type MLI **(05)**

PART - B

Q5. Show that the fundamental rms value of per-phase output voltage of low frequency for an m-pulse cycloconverter is given by **(10)**

$$V_{or} = V_{ph}(m|\pi)sin(\pi|m)$$

Here, V_{or} is represented as the voltage reduction factor.

Q6.a) Draw the waveforms of output voltage equation, v_o, phase 'A' current, i_A, and thyristor current, i_{T1} for the speed control of separately-excited DC machine using three-phase full-converter. **(08)**

b) Derive the expressions for the rms and average values of thyristor currents. **(02)**

Q7. a) Derive the expression for electromagnetic torque at maximum condition with stator frequency control of three-phase Induction motor. **(05)**

b) Explain the working of single-phase full-wave converter for speed control of DC machine. **(05)**

x-x-x