2123
B.E. (Electrical and Electronics Engineering)
Seventh Semester
EE-710: Power Electronic and Drives

Time allowed: 3 Hours   Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory.

x-x-x

1. Attempt the following:-

   (i)   Why do we need forced commutation in step-down cycloconverters? (2)

   (ii)   Draw the circuit of two-phase, three level Flying Capacitor MLI.   (2)

   (iii)   Give the range of firing angle control for single phase voltage controllers for RL load. Justify.   (2)

   (iv)   Why internal control of inverter is preferred over external control of output voltage in inverters.   (2)

   (v)   Discuss the significance of Modulation Index as applicable for Pulse Width Modulation techniques in inverters.   (2)

2.   (a) Describe the principle of operation of three-phase bridge inverter operating in 120-degree conduction mode with necessary diagrams.   (5)

      (b) A single-phase full bridge inverter has RLC load of R=4 ohms, L=35mH and C=155microFarad.The dc input voltage is 230 V and the output frequency is 50 Hz. Find the expression for load current up to 5th harmonics. Also calculate value of fundamental load current.   (5)

3.   (a) State the advantage of DC Link Static Scherbius Drive over other drives used for Induction motors. Explain its operation to obtain super-synchronous speed of Induction Motors.   (5)

      (b) With appropriate circuit diagram and waveforms explain single phase full converter dc drive.   (5)

4.   (a) For a three phase CC that accepts 230 V/50 hz supply , draw its schematic diagram and fabricate a single phase output voltage waveform from it with reduction factor of 1/8 th clearly indicate the sequence of triggering of SCRs.   (5)

      (b) For three-phase ,3 L flying capacitor MLI,draw its switching table to obtain different levels of output.For 'n' level Flying MLI ,explain how many switches and capacitors will be required per phase.   (5)

P.T.O.

5.   (a) For RL load, explain the working of single phase full wave ac voltage controller and derive its expression for rms value of voltage.   (5)
       (b) Draw the electric drive that works on controlling the rotor resistance of induction motor and explain its operation with help of proper waveforms. Also show the plot for T-S as rotor resistance is varied.   (5)

6.   Describe modified McMurray Bedforth Half Bridge Inverter with appropriate voltage and current waveforms. The total commutation interval may be sub-divided into certain well-defined modes for the purpose of explaining its operation.   (2+2+2+2+2)

x-x-x