

Exam.Code:0937

Sub. Code: 6991

2021

B.E. (Electrical and Electronics Engineering)

Seventh Semester

EE-710: Power Electronics and Drives

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory.

x-x-x

- I. Attempt the following:-
- Draw a three phase to three phase bridge cyclo-converter configuration which can be utilized for driving industrial drives with isolated load phases.
 - Draw any technique to obtain external control of dc input voltage in order to obtain control on output voltage.
 - Draw the circuit of two-phase, three level Flying Capacitor MLI.
 - Why continuous or pulse gating is required in ac voltage controllers while feeding inductive loads?
 - Induction motor speed control with constant-supply voltage and reduced-supply frequency is rarely used in practice. Justify this statement. (5x2)
- II.
- Explain how DC Link Static Scherbius Drive is operated to obtain slip- recovery in case of Induction Motor Drive.
 - Showing the type of converters used for running a single-phase full converter dc drive. Write the equations for V_t and V_f as applicable for this drive and specify its quadrant of operation. (2x5)
- III.
- Elaborate the significance of 'Integral Cycle Control' ac voltage controllers. (1)
 - For RL load, draw a neat circuit diagram of 2-stage sequence control of Voltage Controllers, and draw the waveform for output voltage and current clearly marking the sequence of triggering of SCRs. (5)
 - Draw the configuration for single-phase 5 level H-bridge MLI. Write the switching states to obtain 5 levels of output voltages from it. (4)

P.T.O.

(2)

- IV. a) For a three phase to single phase CC that accepts 230 V/50 hz supply, draw its schematic diagram, explain the sequence of triggering of SCRs for obtaining single phase output voltage at 6.25 Hz. Also draw the output voltage and current waveform as obtained in this case.
- b) Draw a single-pulse modulated waveform obtained from a inverter operated in PWM mode hence give the fourier analysis of its output voltage and derive the expression for V_{onm}/V_{on1} (i.e output voltage for nth harmonic and fundamental harmonic). (6,4)
- V. a) Discuss the principles of working of a three-phase bridge inverter with an appropriate circuit diagram. Draw phase and line voltage waveforms on assumption that each thyristor conducts for 120 degree with resistive load connected in star. Also indicate the sequence of firing of various SCRs.
- b) Explain 'static rotor resistance control' method as applicable for Induction motor drives. Also show the plot for T-S as rotor resistance is varied. (6,4)
- VI. a) For a single phase CSI with ideal switches, draw its circuit diagram, the output waveform for current, voltage and input voltage waveform.
- b) Draw the circuit diagram of Single-Phase Bridge Cyclo-converter. Explain its working in step-up mode for continuous current conduction mode. (6,4)

x-x-x