

2122

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.**

- I. What will be the progressive step variation in firing angle for three-phase to single-phase cycloconverter to reduce output frequency by factor of 8. (2)
 - II. What do you understand by neutral point clamped MLI? (2)
 - III. What type of gating signal is used for single phase voltage controller with RL load ? Explain (2)
 - IV. Explain external control of dc input voltage for obtaining output voltage control of inverters. (2)
 - V. For controlling Induction motors, the drives do not practise reduced-supply frequency methods. Justify this statement. (2)
2. (a) What is pulse width modulation. Explain in detail sinusoidal pulse modulation technique used in inverters. (5)
- (b) Explain the working of a current source inverter feeding a capacitive load with appropriate waveforms. (5)
3. (a) The speed of a separately excited dc motor is controlled by means of a three-phase semi-converter from a three phase, 415 V, 50 hz supply. The motor constants are inductance 10 mH, resistance 0.9 ohms and armature constant 1.5 V/rad/s(Nm/A). Calculate the speed of this motor at a torque of 50 Nm when the converter is fired at 45 degrees. (5)
- (b) Explain stator voltage control method using power electronics converter for speed control of three-phase induction motor. (5)
4. (a) Explain the working of single-phase bridge cycloconverter working in step-up mode for continuous current conduction mode. (5)
- (b) Draw the configuration for single-phase 5 level H-bridge MLI .Write the switching states to obtain the 5 different levels of output voltage from it. (5)

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(2)

5. (a) For R and RL load draw a neat circuit diagram of 2-stage sequence control of ac voltage controller and explain its working along with waveforms. (5)
- (b) (i) What is meant by negative group in cycloconverters.
(ii) How do you differentiate between VSI and CSI.
(iii) What is integral cycle control in voltage controllers.
(iv) Draw a single phase 3 level NPC MLI. (5)
6. (a) For a single-phase full bridge inverter connected with RLC load operating in 180 degree mode indicate the devices that conduct during different intervals of one cycle. Also resolve the output voltage waveform into Fourier series. (5)
- (b) A star connected load of 15 ohms per phase is fed from 420 V dc source through a 3-phase bridge inverter. For 180-degree mode, determine the rms value of load current and load power. (5)

x-x-x