

1058

B.E. (Electrical and Electronics Engineering)
Sixth Semester
EE-606: Power Electronics and Drives (OLD)
(May – 2017)

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. Assume any any missing data.

x-x-x

Q. I.

- What is the advantage of a high frequency series inverter?
- Define the duty cycle of an integral control regulator?
- What is the advantages of CSIs over VSIs?
- How can input DC voltage to an inverter be controlled?
- What is the role played by the diodes in 120° mode VSI? (5x2=10)

PART-A

Q.II a) A single phase resistance load is fed from a single phase supply through a TRIAC in phase angle control mode. Find the firing angle if power delivered is 30% of the maximum power. (5)

b) Derive the equation for instantaneous current in a single phase full wave regulator feeding R-L load. Why are short duration gate pulses not sufficient in this? (5)

Q.III. a) Discuss the principle of working of a 3-phase bridge inverter with an appropriate circuit diagram. Draw the phase and line voltage waveforms on the assumptions that each SCR conducts for 120° and the resistive load is star connected. (5)

b) What is a current source inverter? Discuss the working of a single phase current source inverter. (5)

Q.IV. a) What is principle of working of a multilevel inverter? What are its advantages and applications? Hence draw the circuit for 5-level cascaded type multilevel inverter. (5)

b) What is sinusoidal pulse width modulation? How is it obtained? Explain with the help of neat diagram. (5)

PART-B

Q.V. a) Compare the dual converters with the cycloconverter. Hence explain with neat diagram and waveforms the working of a single phase to three phase cycloconverter. **(5)**

b) How can an electric drive be controlled using a microprocessor? Give the necessary schematic and explanation. **(5)**

Q.VI. a) Explain the working of matrix converter with the help of a neat circuit diagram and waveforms. Where is the application of a matrix converter done? **(5)**

b) A separately excited DC motor is fed from a 500 V DC source through a one quadrant chopper. The armature resistance and current are 0.1Ω and 200 A respectively. The voltage and torque constants are 1.4 V/A rad/sec and 1.4 N-m/A^2 . The field current is 2 A. The duty cycle of the chopper is 0.5. Find the input power, speed and the torque. **(5)**

Q.VII. Write short notes on any two:

a) Induction motor drives

b) Three phase converter drives

c) Industrial application of DC drives.

(5x2=10)

x-x-x