Total No. of Questions : 8]

SEAT No. :

PE-2542

[Total No. of Pages : 3

[6583]-69
T.E. Electrical Engineering
Power Electronics
(2019 Pattern) (Semester - V) (303142)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :

1) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q. 5 or Q. 6, Q. 7 or Q. 8.***
2) ***Figures to the right side indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable additional data, jf necessary.***
5) ***Use of non-programmable calculator is allowed.***

Q1) a) Draw and explain Single phase semi converter feeding R load with output voltage and current wave forms. Also derive output average and rms voltage equation. **[9]**

b) Explain working of a single phase half controlled bridge converter without freewheeling diode feeding RL load with neat circuit diagram and output voltage and current waveform. **[9]**

OR

Q2) a) A fully controlled single phase bridge rectifier is supplied from a 50 Hz, 230/100 V transformer. The rectifier supplying a highly inductive load of 15 Ω resistor. For a firing angle of 60°, determine the rectified voltage, the rectified current: **[4]**

b) Explain how single phase full converter can operate as rectification and inversion mode with the help of output voltage waveforms with proper firing angle. **[6]**

c) Describe working of circulating current type single phase dual converter with waveforms. **[8]**

P.T.O.

Q3) a) Compare Three phase Semi converter and Three phase fully controlled converters based on Number of SCRs, Quadrant of Operation, and Modes of Operation. **[3]**

b) Explain working of two stage AC Voltage regulator with RL Load. Draw output voltage waveforms. **[6]**

c) Draw and explain working of Three phase semi controlled converter connected to R Load with neat circuit diagram and waveforms for firing angle $\alpha = 30°$ and $\alpha = 0°$ **[8]**

OR

Q4) a) Draw single phase AC Voltage regulator with R Load and output voltage waveforms. **[3]**

b) Draw and explain 3ϕ full converter with freewheeling diode for RL load. Draw output voltage and current waveforms for $\alpha = 30°$ and $\alpha = 0°$. **[8]**

c) A Three phase full converter operating from three phase, star connected, 415 V, 50 . Hz supply with resistive load. Determine average output voltage for continuous. mode at $\alpha = 65.77°$ and discontinuous mode at $\alpha = 126.12°$. **[6]**

Q5) a) Compare VSI & CSI (4 Points) **[4]**

b) Explain working of single-phase full bridge voltage source Inverter connected to RL load with neat circuit diagram. Draw output voltage and current waveforms. **[6]**

c) Explain sinusoidal pulse width modulation used in inverters. Show four pulses per half cycle of O/P voltage. **[8]**

OR

Q6) a) What is mean by Load Commutated CSI. **[4]**

b) Explain working of single-phase current source inverter with neat circuit diagram. Draw output voltage and current waveforms **[6]**

c) What is the need of controlling o/p voltage of an inverter? Explain briefly and compare various methods employed for the control of o/p voltage in inverter. **[8]**

Q7) a) With the help of neat circuit diagram, six steps of output voltage waveforms, explain the operation of 180º conduction mode 3ϕ voltage source inverter for resistive load. **[10]**

b) Draw circuit diagram of three level flying capacitor converter and explain its principle and working of operation **[7]**

OR

Q8) a) What is necessity of using Multilevel Inverters? Draw circuit diagram of H bridge multilevel Inverter. . **[5]**

b) Compare multi-pulse and multilevel inverters. **[6]**

c) Draw a neat diagram and explain working of cascaded multilevel converter. **[6]**