Total No. of Questions : 8]

SEAT No. :

PC-1745

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T.E. (Electrical Engineering)

POWER ELECTRONICS

(2019 Pattern) (Semester - I) (303142)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :

1) ***Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7or Q8.***
2) ***Figures to the right 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) Explain the operation of single phase fully controlled bridge converter with RL load. Derive the equation for average and rms output voltage. Draw waveforms of output voltage and current for $\alpha = 60°$ with continuous conduction. **[9]**

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

OR

Q2) a) With neat circuit diagram explain operation of single phase semi controlled converter connected to R Load. Derive the equation for average and rms output voltage. Draw output voltage and output current waveforms for $\alpha = 45°$ **[9]**

b) A single phase fully controlled bridge converter is connected to R Load of 10Ω. The input voltage to the bridge is 230 V. Calculate. **[8]**

i) Average and RMS load voltage

ii) Average and RMS load current

Firing angle is 60 degrees.

P.T.O.

Q3) a) Explain working of three phase full controlled converter with RL Load. Draw output voltage and current waveforms for α =30°. Derive the expression for average and RMS output voltage. **[9]**

b) Explain operation of two stage ac voltage regulator with an output waveform for RL load. **[9]**

OR

Q4) a) Explain operation AC voltage regulator with an output waveform for RL load. Derive the expression for average and RMS output voltage. Daw the waveform for α = 60° **[9]**

b) Explain working of three phase Semi controlled converter with R Load and firing angle of 30 degrees. Draw output voltage waveforms. **[9]**

Q5) a) Explain working of single-phase full bridge voltage source Inverter connected to RL load with neat circuit diagram. Draw output voltage and current waveforms. **[9]**

b) Explain sinusoidal PWM technique for inverters. How voltage and freq. control is achieved? **[8]**

OR

Q6) a) State different voltage control techniques used in single phase inverter. Elaborate any two methods in detail. **[9]**

b) Explain with circuit diagram and waveforms operation of single-phase current source inverter. **[8]**

Q7) a) Explain working of three phase six step voltage source inverter in 180° mode of operation. For star connected load draw output voltage waveforms. Show devices conducting in each step. **[10]**

b) What are different harmonic elimination techniques in inverter? Explain any two methods in details. **[8]**

OR

Q8) a) Explain working of three phase six step voltage source inverter in 120° mode of operation. For star connected load draw output voltage waveforms. Show devices conducting in each step. **[10]**

b) Compare multi-pulse and multilevel inverters. **[8]**

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