

T.E Electrical & C.B.G.S
Power Electronics

10-12-14
QP Code : 14967

Duration: - Three Hours

Total Marks assigned to the paper: - 80

Instructions to the candidates, if any: -

Note:

- Question No. 1 is compulsory.
- Answer any **three** from the remaining five questions.
- Assume suitable data if necessary and justify the same.
- Figures to the right indicate the marks.

- Q1 Each question carry five marks. 20M
- List the advantages and disadvantages of Current source inverter over Voltage source inverter.
 - Once SCR is triggered, gate loses its control. Why?
 - What is a DC-DC converter? List few applications of it.
 - What problem is caused by sharp single pulse triggering in a single phase AC voltage controllers when the load is inductive? How can this be solved?
- Q2
- Explain the concept of space vector modulation. 05M
 - Compare the properties of power BJT, power MOSFET and IGBT 05M
 - Explain with relevant circuit diagrams and waveforms the working of a single phase bidirectional phase control type AC voltage controllers connected to R load and obtain a relationship between the r.m.s. output voltage and the r.m.s. input voltage. 10M
- Q3
- Draw a neat circuit and explain the working of full wave fully controlled 6-pulse 3ϕ bridge circuit with resistive load. Draw the corresponding input and output voltage waveforms when the firing angle $\alpha=90^\circ$. 10M
 - A single phase full wave fully controlled bridge rectifier is operated with an R-L load. Calculate average D.C. output voltage, input power factor, displacement factor and Total Harmonic distortion, if a 50 Hz. Sinusoidal voltage of 220 V. peak is applied. 10M
- Q4
- Explain with a neat circuit diagram and relevant waveforms, the working of a boost regulator and derive the expression for output voltage, filter capacitance and filter inductance. 10M

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T.E Electrical & Electronics
Year 2

10/12/14

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- b Explain dynamic characteristics of SCR with wave forms. 10M
- Q5 a Explain with relevant wave forms any one method to control the magnitude and frequency of the output voltage of the single phase inverter. 10M
- c Explain with circuit diagram and waveforms, three phase bridge inverter for 120° conduction mode. 10M
- Q6 Explain the following 20M
 - a Basic working principle of Matrix converter.
 - b Any two commutation circuits of SCR
 - c Comparison of fully controlled and half controlled full wave rectifier with R-L load.
 - d Snubber circuit of SCR.

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