Code No: A4302 **NR**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I Semester Examinations, April/May 2012
ANALYSIS OF POWER ELECTRONIC CONVERTERS
(POWER ELECTRONICS)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks

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1. Explain the operation of a single phase AC voltage controller with inductive load. And also derive the equation for rms output voltage and average value of thyristor current.

2. The three – phase unidirectional controller supplies a $\perp\!\!\!-$ connected resistive load with R = 2.5 Ω and the line to line voltage is 208V, 60Hz. If the desired power is P_0 = 12 KW, calculate a) delay angle b) RMS output phase voltage c) input power factor.

3. Explain the operation of a three phase semi converter for $\alpha \le \pi/3$. Also derive the rms output voltage. Use necessary circuit and wave forms.

4. Explain the operation of Buck – Boost Regulator using the necessary circuit diagrams and wave forms. Also derive the conditions for continuous inductor current and capacitor voltage.

5.a) Explain the operation of three – phase bridge inverter for 120^0 conduction.
b) The output voltage of a single phase full – bridge inverter is controlled by pulse width modulation with one pulse per half cycle. Determine the required pulse width so that the fundamental rms component is 70% of dc input voltage.

6. Explain in detail the Extinction angle control and symmetric angle control methods used for the improvement of power factor of phase controlled converters.

7.a) What are the advantages and disadvantages of AC voltage controllers?
b) What are the main differences between the voltage source and current source inverters?

8. Write a short notes on the following
a) Synchronous tap chargers
b) Single phase series converter
c) Phase displacement control.

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