

**Subject Code: G4302/R13**

**M. Tech – I Semester Regular/Supplementary Examinations, April, 2015**

**ANALYSIS OF POWER ELECTRONICS CONVERTERS**

**(Common to PE, P&ID, PE&ED, PE&D, EM&D and PE&PS )**

**Time: 3 Hours**

**Max Marks: 60**

**Answer any FIVE questions**

**All questions carry EQUAL marks**

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- 1 a). Explain the PWM control on ac voltage controllers and draw the waveforms of output voltage and load current?  
b). What is Synchronous tap changer? Obtain expressions of output voltage and current with Resistive load?
- 2 a) The three-phase full wave ac voltage controller supplies a Y-connected resistive load of  $R = 15\Omega$  and the line-to-line input voltage is  $V_s = 208\text{ V}$  at 50 Hz. The delay angle is  $\alpha = \pi/6$ . Determine  
i) The input PF &  
ii) The expression for the instantaneous output voltage of phase A.  
Draw the waveforms.  
b) What are the effects of source and load inductances on the operation of ac voltage controller?
- 3 a) What is Extinction angle and symmetrical angle control of converters?  
b) A single phase full converter is connected to RLE load. The source voltage is 230V, 50 Hz. The average load current of 10 A is continuous over the working range. For  $R = 0.4$  and  $L = 2\text{ mH}$ , compute firing angle delay for  $E = 120\text{ V}$ ?
- 4 a) Explain the operation of a Three-Phase 12 Pulse converter along the necessary circuit diagrams and wave forms?  
b) Evaluate the input power factor and harmonic factors for a Three-Phase half controlled converters?
- 5 a) How can the input current of the rectifier-fed boost converter be made sinusoidal and in phase with the input voltage?  
b) Obtain the steady state analysis of rectifier-fed boost converter for improving power factor?
- 6 Explain the single PWM, multiple PWM, and sinusoidal PWM and modified sinusoidal PWM techniques of a single phase inverter?
- 7 a) Briefly explain the operation of modified diode-clamped multilevel inverter?  
b) Compare various merits and demerits of multilevel inverters?
- 8 Briefly explain the following  
a) Operation of variable dc link inverter  
b) Features of cascaded multi level inverter

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