

**B.Tech. – VIEP – ELECTRICAL ENGINEERING  
(BTELVI)**

00045

**Term-End Examination**

**June, 2014**

**BIEEE-018 : ADVANCED POWER ELECTRONICS**

*Time : 3 hours*

*Maximum Marks : 70*

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**Note :** Answer any *seven* questions. Each question carries equal marks.

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1. (a) Explain switching characteristics of an IGBT. 5  
(b) Describe the basic structure of MOS controlled thyristor. Explain the turn on and turn off processes. 5
  
2. Compare  $1\phi$  Full converter with  $3\phi$  Full converter. Explain the operation of  $3\phi$  Full converter for RL type load. Draw the waveforms also. 10
  
3. (a) What is blanking time ? 4  
(b) A  $3\phi$  Full converter is used for charging a battery with an emf of 110 V and an internal resistance of  $0.2\ \Omega$ . For a constant changing current of 10 A, compute the firing angle delay for ac line voltage of 220 V. 6

4. What is the need for controlling the voltage at the output terminals of an inverter ? Describe briefly and compare the various methods employed for controlling the voltage at the output. 10
5. (a) Explain the operation of single-phase auto commutated sequential inverter. 5
- (b) In a self commutated SCR circuit the load consists of  $R = 10 \Omega$  in series with commutating components  $L = 10 \text{ mH}$ ,  $C = 10 \mu\text{F}$ . Check whether the circuit will commute by itself when triggered from zero voltage condition on the capacitor. What will be the voltage across capacitor and inductor at the time of commutation ? 5
6. (a) Explain the three-phase  $120^\circ$  mode of conduction in bridge inverter. Draw the waveform also. 6
- (b) A single-phase full bridge inverter feeds power at 50 Hz to RLC load with  $R = 5 \Omega$ ,  $L = 0.3 \text{ H}$ ,  $C = 50 \mu\text{F}$ , the dc input voltage is 220 V. Find the expression for load current upto 5<sup>th</sup> harmonic. 4
7. Compare Series compensator with Shunt compensator. Explain the operation of SSSC. 10

8. Write short notes on the following :

$$4 \times 2 \frac{1}{2} = 10$$

- (i) MOSFET
- (ii) GTO
- (iii) Active Power Filter
- (iv) TCR

9. Explain the three-phase SPWM inverters. What is the effect of Blanking Time on inverter output voltage ?

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