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BIEEE-018

B.Tech. ELECTRICAL ENGINEERING (BTELVI)

Term-End Examination

December, 2013

00391

BIEEE-018 : ADVANCED POWER ELECTRONICS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions out of **eight** questions. Each question carries **equal** marks.*

1. (a) Explain switching characteristics of an IGBT. Why are IGBT becoming popular in their applications ? Enumerate some applications of IGBT. **6**

(b) A bipolar transistor having β in range θ to 40. The load resistance $Rc = 11\Omega$, dc supply voltage $Vcc = 200V$, $V_B = 10V$, If $V_{CE}(rat) = 1.0v$ and $VB_E(rat) = 1.5$ V find **4**

(i) The value of R_B that results in saturation with an over drive factor 5.

(ii) forced β_f

(iii) Powerloss P_T

2. What is harmonic ? Explain the methods to eliminate harmonics from inverter O/P voltage. **10**

3. Explain the working of 3ϕ full converter with the help of waveforms. Consider the load in RL type. **10**

4. (a) Explain simisoidal pulse modulation as used in PWM inverters. 6

(b) Calculate the O/P frequency of a series inverter with following parameters. 4
$L = 6mH$, $c = 1.2\mu f$, load resistance $R = 100\Omega$ ToH = 0.2ms, of load resistance is varied from 40 to 140 ohms. Find the range of O/P frequency.

5. Explain the 3 ϕ 120° mode of conduction in bridge inverters. Draw the waveforms also. 10

6. What is the need of compensation ? Give a comparison b/w series compensation and shunt compensation. Explain the operation of Thyristor Controlled Reactor (TCR). 10

7. Derive a general expression for fundamental harmonic content of a quasi squarewave o/p inverter. Plot curve showing harmonic variation of the wave on period. 10

8. Write short notes on : 10
(a) GTO
(b) MOSFET
(c) Active filter
(d) Effect of blanking time in inverter.