B.tech 7th semester exam 2013 Paper Code-031724

Subject-Applied power electronics Time-3 hours Full mark-70

Instruction:-

(i)The marks are indicated in the right hand margin. (ii)There are EIGHT questions in this paper.
(iii)Attempt FIVE question in all. (iv)Question no.1 is compulsory.

1.Choose the correct answer (any seven) 14

(a)The correct sequence of given devices in the decreasing order of their speeds of operation is

(i)power BJT,power MOSFET,IGBT,SCR (ii)IGBT,power MOSFET,power BJT,SCR
(iii)SCR, power BJT,IGBT,MOSFET (IV)MOSFET,IGBT,power BJT,SCR

(b)In a thyristor,holding current I(H) is

(i)more than latching current I(L) (ii)less than latching current I(L)
(iii)equal to latching current I(L) (iv)equal to zero

(c)When a thyristor is ON,its gate drive

(i)be removed to save power (ii)be removed or may not be removed
(iii)not be removed as it will turn off the thyristor (iv)be removed to avoid increased losses and higher junction temperature

(d)If the magnitude of gate pulse to thyristor is increased,then

(i)both delay time and rise time would increses www.akubihar.com
(ii)the delay time would increases but the rise time would decreases
(iii)the delay time would decreases but the rise time would increases
(iv)the delay time would decreases but the the rise time remains uneffected

(e)Static voltage equalization in series connected SCR's is obtained by

(i)one resistor across the string (ii)resistors of different values across each SCR
(iii)resistors of same value across each SCR (iv)one resistor in series with the string

(f)R-C snubber is used in parallel with the thyristor to

(i)reduce dv/dt across it (ii)reduce di/dt across it
(iii)limit current through the thyristor (iv)ensure its conduction after gate signal is removed

(g)Two thyristor A and B havr rated gate currents of 100 mA and 2 A respectively if

(i)B is GTO and A is conventional SCR (ii)A is GTO and B is conventional SCR
(iii)thyristor A may not operate as transistor (iv)none of the above

(h)In a thyristor d.c. chopper,which type of commutation results in best performance ?

(i)voltage commutation (ii)current commutation (iii)load commutation (iv)supply commutation

2. (a)Describe the switching characteristics of power MOSFETs. 8
(b)compare power MOSFET with BJT. 6

3. (a)Give the equivalent circuit and principle of operation of IGCT. 8
(b)Explain the characteristics of IGCT. 6

4. What is the principle of series resonant inverters?What are the effects of both series and parallel loading in a series resonant inverter?Enumerate its advantages and disadvantages. 14

5. What is the basic principle of a boost inverter?Explain the method of its voltage control.What are the reasons for addding a filter on the inverter output. 14

6. (a)Explain the drive circuit for MOSFETs and IGBTs.Give its application. 8
(b)Explain dual converter. 6

7. Describe breifly sinusoidal PWM.What is the purpose of over modulation. 14

8. Write short note on any two of the following :-

(a)MCT (b)Buck converter (c)Advantage and application of MEMS (d)pulse transformer