B.E. Sem 8 (Rev.) Power Electronics 02/12/08.
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Con. 5252–08. (REVISED COURSE) RC–7640

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from remaining.
(3) Assume **suitable** data if **necessary**.

1. (a) Is it possible to obtain Inversion mode operation in case of semiconverter feeding active load. Justify the answer. **20**
   (b) Compare IGST and SCR.
   (c) A thyristor is triggered by a pulse train of 5KHz. Duty Ratio of pulse train in is 0·5. If allowable average Gate Power is 100 watts. Calculate the true maximum allowable gate drive power.
   (d) Explain $\frac{dv}{dt}$ and $\frac{di}{dt}$ rating along with proper protection circuit for SCR.

2. (a) Explain pulse triggering method using UJT synchronized circuit for full wave (midpoint) configuration with neat diagram. **10**
   (b) In case of F.C.B.R. (single phase) feeding an active load, assuming constant output current. Draw the following waveforms : **10**
   (i) output voltage (ii) output current
   (iii) supply current (iv) voltage across any SCR.

3. (a) A 3 phase full wove converter bridge is connected to supply voltage of 230 V per phase and frequency of 50 Hz. The source inductance per phase i.e. L_s is 4 mH. The load current is 20 Amp. If the load consists of d.c. voltage source of 400 volt with internal resistance of 1Ω. Calculate : (i) firing angle delay (ii) overlap angle. **10**
   (b) Explain the operation of A.C. phase control circuit using Triac–Diac for 1amp. Dimmer applications. Draw the waveform across load. **10**

4. (a) Why commutation failure may occur in case of Jones chopper ? How it can be avoided ? **10**
   (b) In a basic step down d.c. chopper circuit Input voltage is 230 V, R = 10 Ω, drop across chopper is 2 volt. Duty cycle is 0·4. Determine : (i) Av. output voltage (ii) rms o/p voltage (iii) chopper efficiency. **10**

5. (a) Explain the operation of complementary commutation circuit. Draw the waveform across any one SCR and capacitor. **10**

   (b) Explain the operation of basic series inverter and obtain an expression for turn off time available in terms of W_o and W_r. **10**

6. (a) Explain microcontroller based closed loop speed control method of D.C. Motor. **10**

   (b) Explain v/f control method for speed control of induction motor. **10**

7. Write short notes on (any **three**) :– **20**

   (a) Triggering circuit using IC TCA 785

   (b) Performance parameters of uncontrolled rectifier

   (c) Isolation technique

   (d) IR compensation techniques.
