JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MAKEUP EXAMINATION- 2016

B.Tech VI Semester

COURSE CODE: 11B1WEC611   MAX. MARKS: 25

COURSE NAME: Power Electronics

COURSE CREDITS: IV   MAX. TIME: 1Hr 30 Min

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q1. Using circuit diagram and wave shapes explain the working of single phase full converter feeding RLE load. A single phase 230V, 1kW load is connected across 1- phase 220V, 50Hz supply through an SCR. For firing angle delay of 90°, calculate the power absorbed in the heater element.   [5]

Q2. Draw equivalent circuit diagram for UJT and explain how this device works. Also derive the expression for frequency of oscillation for UJT relaxation oscillator.   [5]

Q3. For a two transistor model of thyristor, following data is given,

   i)   Current gain for npn transistor is 0.5
   ii) Current gain for pnp transistor is 0.4

   Calculate the value of minimum gate current, if anode current of value 20A is required.   [5]

Q4. For the circuit shown in figure 2, identify the type of commutation. If capacitor is initially charged to V_S with polarity as shown, find the circuit turn off time for the main thyristor in case C = 10μF, R=5Ω, and V_S= 200V.
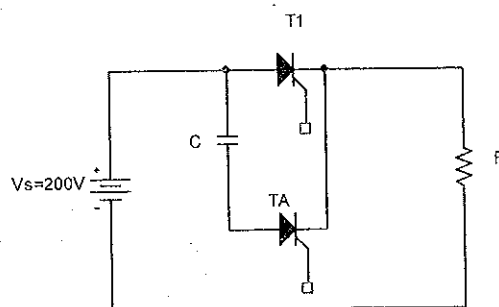
                                                                                          [5]

Q5. What is the effect of unequal voltage distribution across SCR strings during their turn on and turn off process? Suggest methods to minimize this effect.   [5]