

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2016

B.Tech VI Semester

COURSE CODE: 10B1WEC613

MAX. MARKS: 25

COURSE NAME: Power Electronics

COURSE CREDITS: 4

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. Explain the various modes of operation for TRIAC using its constructional details. What are the advantage of using TRIAC over DIAC? [5]
- Q2. Explain how a power device fails due to exceeded $\frac{di}{dt}$ rating and $\frac{dv}{dt}$ rating? Suggest some circuit design to avoid the failure. State the role of each component used in protection circuit and explain using mathematical modeling how the circuit ensures safe mode of operation. [5]
- Q3. A 1- Φ , one pulse controlled converter feeds an RL load with a freewheeling diode across load. Discuss how freewheeling diode comes into play when supply voltage is passing through zero and becoming negative. What are the advantages of using freewheeling diode? Sketch waveforms for supply, load current and load voltage. [5]
- Q4. Explain the working of a resonant pulse commutation circuit using circuit diagram and wave shapes. Calculate circuit turn off time for a constant load current of 150 A, if supply voltage is 250V, $C = 50\mu\text{F}$, $L = 5\mu\text{H}$ and initial capacitor voltage is 250V. Also compute changes in circuit turn off time if constant load current drops to 100A. [5]
- Q5. How can we achieve a firing angle greater than 90° using RC firing circuit? Illustrate your answer with the help of circuit diagram and appropriate waveforms: What changes are required in the circuit for synchronous gate triggering circuit? [5]