

COURSE CODE: 11B1WEC611

MAX. MARKS: 50

COURSE NAME: POWER ELECTRONICS

COURSE CREDITS: 04

MAX. TIME: 2 HRS

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

- Q1. Describe the operation of a single-phase two-pulse mid-point converter with relevant voltage and current waveforms. Discuss how each SCR is subjected to a reverse voltage equal to double the supply voltage in case turns ratio from primary to each secondary is unity. Find the circuit turn-off time provided to each SCR by this converter configuration. [10]
- Q2. Show that the performance of a single-phase full converter as affected by source inductance is given by the relation $\cos(\alpha + \mu) = \cos\alpha - \frac{\omega L_s I_0}{V_m}$ where the symbols used have their usual meanings. [10]
- Q3. (a) For type-A chopper feeding an RLE load, find an expression for the duty cycle for which the average current rating of freewheeling diode would be maximum. Assume constant load current. [5]
(b) Describe the principle of step-up chopper. [5]
- Q4. (a) For a single phase voltage controller, develop a relation between conduction angle γ and firing angle α and plot their variation as a function of load phase angle ϕ . [5]
(b) Discuss the principle of phase control in single-phase full wave ac voltage controller. [5]
- Q5. What is cycloconverter? Explain the basic principle of working of single-phase to single-phase step-down cycloconverter for both continuous and discontinuous conductions for a bridge type cycloconverter. [10]