

**MEPE-102****M.E./M.Tech., I Semester**

Examination, June-2013

**Power Electronics Devices and Phase Control***Time : Three Hours**Maximum Marks : 70**Note: Attempt any five questions.**All questions carry equal marks.*

1. Why is it necessary to isolate gate source from the main supply of the thyristor? Discuss how this isolation is accomplished by a pulse transformer and by an optocoupler. Explain design features of a pulse transformer.

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2. a) Explain the need of the commutation in thyristor circuit. What are the different methods of commutation scheme. Discuss with neat circuit diagram and relevant wave forms, class B commutation.
- b) Discuss in brief the principle of step-up chopper and multi phase chopper.
3. Describe in brief methods of power factor improvements and harmonic reduction in converter fed systems.
4. Describe the working of a 2-pulse AC/DC converter with RLE load and derive expressions for harmonics in input current and output voltage.

5. a) Explain circulating current type ideal dual converter for 3-phase supply and draw current and voltage waveforms.
- b) With the help of neat diagram, explain the operation of resistance firing circuits. Also draw and explain associated wave forms.
6. a) Describe the operating principle of single phase to single phase step up cycloconverter with the help of mid-point configurations. Illustrate your answer with appropriate circuit and waveforms.
- b) Explain the regenerated braking of 3-phase induction motor.
7. a) Discuss the working of single phase CSI with ideal switches. Draw schematic diagram and waveforms.
- b) Explain how the harmonics reduction is obtained in single phase inverters by PWM?

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8. Write short notes on any two of the following :
  - a) MOSFET construction and its characteristics
  - b) Four quadrant choppers
  - c) Line commutated inverter
  - d) Multi phase choppers