Total No. of Questions :8] *[Total No. of Printed Pages :2*

Roll No .....

MEPE - 102

M.E./M.Tech., I Semester

Examination, June 2016

Power Electronics Devices and Phase Control

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Assume suitable data if not given.

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. 14

2. Describe in brief methods of power factor improvements and harmonic reduction in converter fed systems. 14

3. a) Explain the principle of operation of single phase dual converter with neat power circuit diagram. 7
   b) In type A chopper source voltage is 100V, d.c on period = 100 μs, off-period = 150μs and load RLE consists of R = 2Ω, L = 5mH, E = 10V. For continuous conduction, what is the average output voltage and average output current? 7

4. Describe the effect of source inductance on the performance of a single phase full converter indicating clearly the conduction of various thyristors during one cycle. Derive the expression for its output voltage. 14

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5. Describe the working of a 2-pulse AC/DC converter with RLE load and derive expressions for harmonics in input current and output voltage. 14

6. Describe the operating principle of single phase to single phase step up cycloconverter with the help of mid-point configuration. Illustrate your answer with appropriate circuit and waveforms. 14

7. a) Discuss the working of single phase CSI with ideal switches. Draw schematic diagram and waveforms. 7
   b) Explain how the harmonic reduction is obtained in single phase inverters by PWM. 7

8. Write short notes on any two of the following : 14
   a) Isolated transformer
   b) HVDC
   c) Line commutated inverters
   d) MOSFET construction and its characteristics

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