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Reg. No. : .....

Name : .....

First Semester M.Tech. Degree Examination, March 2014
(2013 Scheme)
Branch : Electrical and Electronics Engineering
Streams : Electrical Machines, Control Systems, Power System
EMC 1001 : POWER ELECTRONIC CIRCUITS

Time : 3 Hours Max. Marks : 60

Instruction : *Answer* ***any two*** *questions from* ***each*** *Module.*

Module – I

1. a) Explain the features of an ideal switch. 5
   b) Draw and explain voltage, current and power loss waveform of an ideal switch. 5
2. a) Explain reverse recovery characteristics of power diode. 5
   b) Draw and explain switching characteristics of GTO. 5
3. a) What is symmetrical and asymmetrical GTO ? 5
   b) Differentiate between IGBT and MOSFET. 5

Module – II

4. a) Explain the operation of two sequence control of an ac voltage regulator with R load and RL load. 5
   b) Discuss three basic dc-dc converters with circuit diagram and waveform. 5
5. a) With the help of circuit diagram and waveforms, explain the operation of buck converter. 5
   b) Analyse the discontinuous and continuous current mode operation of a basic buck converter. 5
6. Explain the principle of inductor volt-second balance in a dc to dc converter and derive its equation. 10

P.T.O.

Module – III

7. a) What is an Inverter ? With the help of circuit diagram and waveform explain the operation of single phase bridge inverter. 5

   b) A single phase full bridge inverter is fed from a dc source, such that fundamental component of output voltage is 230V. Find rms value of thyristor and diode currents for the following loads.

      a) $R = 2\Omega$

      b) $R = 2\Omega$, $X_L = 8\Omega$, $X_C = 6\Omega$ 5

8. A basic three phase bridge inverter is supplied from a 600 V source. For a star connected resistive load of 15Ω/phase. Draw the waveform of output phase voltage for 120° conduction and also find rms load current, load power and thyristor ratings. 10

9. Describe a single phase capacitor commutated CSI connected to resistive load, with the help of power circuit diagram and waveforms for gating signals, load current and capacitor voltage. 10