Roll No .....

MEPE-104

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

Examination, June 2013

Forced Communication Circuits

Time : Three Hours

Maximum Marks: 70

Note: Attempt any *five* questions. All questions carry *equal* marks.

1. a) Write down different commutation techniques used for inverters. Explain any one of them in detail with suitable waveforms.

   b) How voltage and harmonics can be controlled in inverters.

2. a) Explain sinusoidal pulse width modulation technique of inverter control. Draw harmonic spectrum of output voltage. How the magnitude of fundamental voltage and harmonic contents can be controlled.

   b) The single phase half-bridge inverter in fig. has a resistive load R=2.4Ω and the dc input voltage is V_s = 48V. Determine

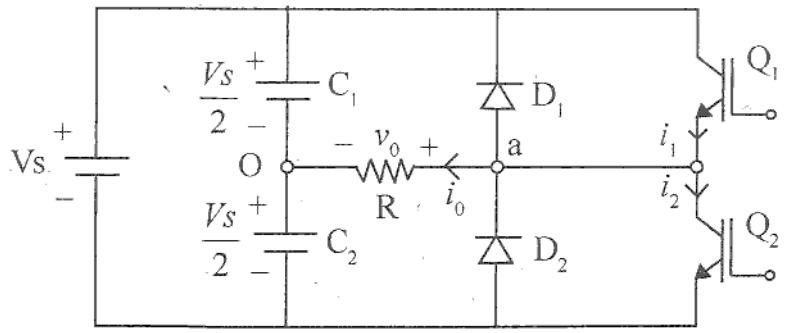
      i) rms output at the fundamental frequency, V_{01},

      ii) Output power, P_0,

      iii) Average & peak current of each thyristor,

      iv) THD

      v) Distortion factor



3. a) Explain the operation of three phase inverter under over modulation region with frequency spectrum.

   b) Draw and explain frequency spectrum of an inverter output voltage. Explain effect of switching frequency no. of harmonic order, amplitude modulation index on its performance.

4. a) Differentiate voltage source inverter and current source inverter.

   b) Explain current source inverter for drives application. Discuss its control scheme in closed loop drive system.

5. a) Explain control techniques used for chopper control. How filter can be designed for chopper circuits.

   b) Discuss a switched mode power supply with its application & design challenges.

6. a) Discuss resonant mode of operation of power supply with suitable diagram & waveforms.

   b) Discuss complete chopper circuit design for step-down chopper with input and output filter.

7. a) Discuss laser power supply. Explain its various components. Write down its limitations.

   b) Explain induction heading with diagram, main features and limitations.

8. Write down short notes on any two:
   i) Safe operating area of a device
   ii) Power supplies for SRM drive
   iii) Dielectric heating

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