EEL843: Major

Note: (i) Draw neat waveforms to scale   Max. Marks: 50

     (ii) List the assumptions used in the analysis   Time: 2 hrs

1. A switch-mode dc-dc boost converter is supplying a constant load power from a fixed dc supply source. Determine the condition for which its inductor average current is maximum. Assume the converter is operating at constant switching frequency.   (08)

2. A buck converter is supplying a constant resistive load of 10 Ohms through a 12 V battery. The load is designed to have optimum performance when it draws power at a voltage of 5 V. The converter consists of energy storage elements: L=220 μH, C=220 μF, and its switching frequency f_s=100 kHz. Determine peak current and voltage stresses on various components and average currents.   (12)

3. Obtain state-space average model for the non-isolated boost dc-dc converter and then develop its system level simulation block diagram.   (10)

4. Draw various waveforms for the full-bridge isolated dc-dc converter when its inductor current is continuous. Also justify the waveforms through suitable mathematical analysis?   (10)

5. Design an inductive filter for a single phase diode bridge rectifier feeding a resistive load of 100 Ohms such that the ripple current is less than 10 % of dc load current. Assume bridge is connected to 220 V, 50 Hz 1-phase ac supply.   (10)

5th May, 2010 (10.30 ~ 12.30 hrs)