09/05/2007 (3.30 ~ 5.30 P.M)

Major: EEL843

Max. Marks: 50 ***Time: 120 minutes***

Draw neat waveforms

1. With the help of neat waveforms explain the principle of operation of the isolated half-bridge topology. How this topology is better than the single switch isolated topologies? Explain the affect of the switching frequency selection on the converter performance.

2. A dc-dc buck converter is provided with the CLC filter on the load side. Obtain its mathematical model and then draw its simulation block diagram if the power conversion inductor operates in the continuous current mode.

3. Mention the disadvantages of the single-switch non-isolated topologies. How do you overcome these limitations? Explain.

4. Design a suitable dc-dc converter, inductor current should be continuous, which will meet the following specifications:

   DC battery voltage=185 V± 10%, load power of 48 watts @ 2 A, maximum allowable load voltage ripple=1 %, inductor current ripple=5 % at nominal load. The available switching devices optimum utilization frequency= 45 ~ 50 kHz, inductor current may fall into discontinuous mode if the ripple frequency is less than 100 kHz.

5. Design a forward converter that needs to supply a load of 10 A at a nominal voltage of 20 V± 1%. The inductor current ripple should not exceed 0.1 p.u at a switching frequency of 50 kHz. Assume the converter input source voltage is 25 V.

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