R13

B.Tech IV Year I Semester (R13) Supplementary Examinations June 2017
SWITCHED MODE POWER CONVERTERS
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 70

PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)
   (a) Explain the principle of volt second balance in inductors.
   (b) Obtain the input-output voltage as a function of duty ratio for a Buck-Boost dc-dc converter in continuous
        conduction mode.
   (c) List out the difference between fly back and push pull topologies.
   (d) Discuss why transformer isolations are needed in high frequency power conversion.
   (e) List the various classifications of resonant converters.
   (f) What is meant by zero voltage switching?
   (g) Explain the significance of small signal modeling in DC-DC converters.
   (h) List out the dynamic performance indices of DC-DC converters.
   (i) List out the controller specifications.
   (j) Why, frequency domain analysis is important in controller design?

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

[**UNIT – I**]

2   (a) Illustrate the operation of step down converter in continuous conduction mode and derive an expression
         for the ripple voltage.
    (b) Calculate V_2 for a given wave form in DC steady state.
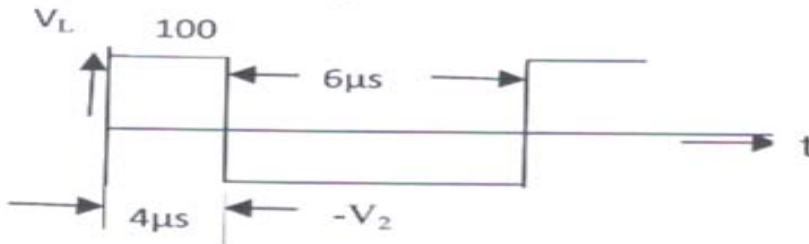
OR
3   Explain the operation of CUK converter and derive output voltage equation.

[**UNIT – II**]

4   (a) Draw the circuit and explain the operation of fly back converter.
    (b) Compare Isolated and non-isolated switched mode converters.
OR
5   Draw the circuit diagram and explain the operation of a full bridge push pull converter and draw the load
        current and load voltage waveform.

[**UNIT – III**]

6   Discuss the operation of parallel resonant dc-dc converter with the help of circuit diagram.
OR
7   Analyze and obtain the output voltage of L - type boost converter.

[**UNIT – IV**]

8   Obtain the steady state solution of the non-ideal boost converter by using its average model.
OR
9   Obtain the transfer function of buck converter using its equivalent circuit.

[**UNIT – V**]

10   Discuss about the controller specifications for design of controller.
OR
11   Explain about the design of proportional, Integral and derivative controller.

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