

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)

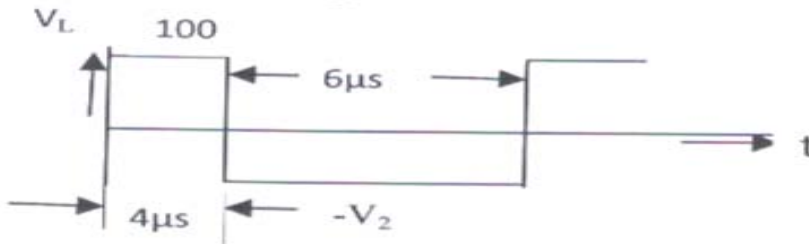
- 1 Answer the following: (10 X 02 = 20 Marks)
- Explain the principle of volt second balance in inductors.
 - Obtain the input-output voltage as a function of duty ratio for a Buck-Boost dc-dc converter in continuous conduction mode.
 - List out the difference between fly back and push pull topologies.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

OR

- 11 Explain about the design of proportional, Integral and derivative controller.
