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# B.Tech IV Year I Semester (R15) Regular Examinations November/December 2018 SWITCHED MODE POWER CONVERTERS

# (Electrical & Electronics Engineering)

Max. Marks: 70

Time: 3 hours

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# PART – A

### (Compulsory Question)

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Answer the following: (10 X 02 = 20 Marks)

- (a) What is a SEPIC converter?
- (b) What are the drawbacks of cuk converter?
- (c) What is the important feature of isolated DC-DC converter over non-isolated converter?
- (d) Why transformer need to be isolated in high frequency operation of power converters?
- (e) Why series resonant circuits are called so?
- (f) How do you classify resonant converters?
- (g) Write the basic state space equations.
- (h) What is averaged model?
- (i) What is a PI controller?
- (j) What is a linear time invariant system?

### PART – B

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

# UNIT – I

2 With a neat power circuit diagram, equivalent circuits and waveforms explain the operation of ZETA converter?

### OR

Derive the expression for the output voltage of the following DC-DC converters in terms of duty ratio:
(i) Cuk converter.
(ii) SEPIC converter.

## UNIT – II

4 Compare isolated and non-isolated switched mode DC-DC converters.

#### OR

5 With a neat power circuit diagram, explain the operation of push-pull DC-DC converters.

### UNIT – III

6 Explain the concept of zero voltage switching in resonant converters.

#### OR

7 Explain briefly about series resonant and parallel resonant circuits.

## UNIT – IV

8 Systematically develop the state space model of buck converter.

### OR

- 9 (a) Explain the significance of small signal models.
  - (b) Write short note on dynamical characterization.

# UNIT – V

10 Explain the functionalities of proportional, integral plus derivative controller.

OR

11 Explain various parameters involved in the frequency-domain analysis of linear time-invariant systems.

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