

Subject Code: H4301/R13

M. Tech –II Semester Regular/ Supply Examinations, October, 2015

SWITCHED MODE POWER CONVERSION

(Common to PE, P&ID, PE&ED, PE&D, EM&D and PE&PS)

Time: 3 Hours

Max Marks: 60

Answer any FIVE questions

All questions carry EQUAL marks

1. a). Briefly explain the operating modes of Buck converter and deduce expression for boundary value of inductance to decide operating modes?
b). When the MOSFETs used in Boost converter are non-ideal components, what are their affects in the converter operation?
2. a) Draw the schematic diagram of full wave zero current switching buck converter and explain its operation?
b) A parallel resonant dc-dc converter has the following parameters
 $V_s = 100\text{ V}$, $L_r = 8\text{ }\mu\text{H}$, $C_r = 0.32\text{ }\mu\text{F}$, $R_L = 10\text{ }\Omega$, $f_s = 120\text{ kHz}$
Determine the output voltage of the converter. Assume the output filter components L_o and C_o produce the ripple free output current and voltage.
3. Explain the operation of quasi resonant ZVS Boost converter and deduce the expression for dc gain?
4. Evaluate
 - (i) Operating mode (CCM or DCM)
 - (ii) Operating duty ratio and
 - (iii) The primary current wave shape and its peak value of the following 10 W Flyback converter shown in Fig. 1

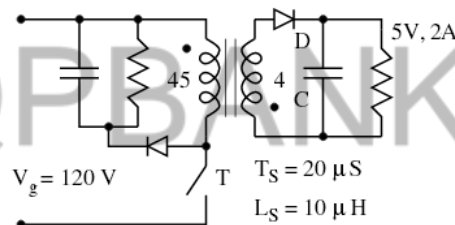


Fig. 1 Flyback converter

5. a) What are the closed loop control requirements in switch mode converter explain in brief?
b) What are the design considerations of the transformer in the switch mode converter?

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6. Obtain the steady state solution of the non-ideal boost converter by using its average model?
7. Obtain the gain and phase plot of the non-ideal boost converter from its transfer function?
8. Explain in brief a) push-pull converter operation b) choice of the switching frequency of isolated switch mode converters

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