Reg. No.



VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

MAKE-UP EXAMINATIONS, DECEMBER 2017

SUBJECT: MODERN POWER CONVERTERS [ELE 4010]

REVISED CREDIT SYSTEM			
Time	: 3 Hours Date: 28 December 2017	Max. Marks	s: 50
Instru	ctions to Candidates:		
*	Answer ALL the questions.		
*	Missing data may be suitably assumed.		
1A.	A buck converter is used to step down 12V to 3.3 V. The output current is converter with a current ripple of 30% and output voltage ripple of 0.5%. As frequency to be 100 kHz. The MOSFET and the diode have an on-state resistance of $19m\Omega$. The resistance of $104m\Omega$. The total switching losses account to 0.18W. Calculate dissipated and the Efficiency of the converter.	3 4A. Design the ssume switching inductor has a the total power	(05)
1B.	A cuk converter has an input of 12 V and is to have an output of -18 V supply Select the duty ratio, inductor sizes such that the change in inductor currents 10% of the average inductor current, the output ripple voltage is no more through ripple voltage across C_1 is no more than 5%. Take $f_s = 50$ kHz.	ing a 40 W load. is no more than han 1%, and the	(05)
2A.	With the help of neat circuit schematic and relevant waveforms, explain the w of SEPIC converter. Assuming continuous mode of operation, determine the inductors and the capacitors for a particular ripple condition. Hence, obtain a output voltage.	orking principle selection of the n expression for	(05)
2B.	Discuss, the performance of a flyback DC-DC converter, and hence draw suitable develop expressions for calculating average load voltage, the necessary fill used.	le waveforms to ter circuit to be	(05)
3A.	A Push-Pull converter has the following parameters: $V_s = 30 \text{ V}$, $N_P/N_S = 2$, $D = R = 6\Omega$, $C = 50 \mu$ F and $f_s = 10 \text{ kHz}$. Determine average output voltage, maximum values of inductor current and the output voltage ripple. Assume all components	0.3 , $L_x = 0.5mH$, m and minimum nts to be ideal.	(05)
3B.	With suitable circuit diagram and relevant waveforms, explain the working bridge dc-dc converter. Hence deduce an expression for the output voltage.	principle of full	(05)
4A.	Explain the continuous-conduction mode operation of SLR dc-dc converter w using suitable circuit diagram and waveforms.	orking in ω _s <ω ₀	(05)
4B.	A parallel resonant dc-dc converter supplying a resistive load of 10Ω from a s 100V. The switching frequency is 20% excess of the resonant frequency c characteristic impedance $Z_o = 5 \Omega$. Select suitable values of L_r and C_r for the hence determine the output voltage.	ource voltage of of 100 KHz, and e converter and	(05)
5A.	The Zero Current Switch resonant converter has following parameters, V $L_r=10\mu$ H, $C_r=0.01\mu$ F and $f_s=50$ kHz. Determine the Output voltage of conv waveforms of inductor current and capacitor voltage for the operation.	s=100V, Io=1.5A, erter. Draw the	(05)
5B.	Discuss the steps involved in developing the state space averaged model for a and hence obtain the generalized expression for the small signal transfer f	dc-dc converter	

converter.

(05)