Reg. No.



VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING) END SEMESTER EXAMINATIONS, DECEMBER 2020

MODERN POWER CONVERTER [ELE 4010]

REVISED CREDIT SYSTEM

Time:	3 Hours	Date: 26 December 2020	Max. Ma	rks: 50
 Instructions to Candidates: ♦ Answer ALL the questions. ♦ Missing data may be suitably assumed. 				
1A.	Make a technical com switched mode power s	parison between linear power suppli upplies.	es and	(02)
1B.	A buck-boost converter at 0.05mH. The input source voltage is 15V converter is supplying b) Find the maximum at the output voltage rippl	is operating at 20kHz frequency and in capacitance is sufficiently large (8 μ 7.The output to be regulated at 10 a load of 10 Ω . a) Calculate the dut nd minimum value of inductor current. e.	nductor F) and V. The cy ratio c) Find	(04)
1C.	With the help of neat operation of cuck conve output and input voltag	circuit diagram and waveform explant erter and also derive the relationship b e.	ain the etween	(04)
2A.	With a neat circuit sch working principle of conduction mode. Deriv	nematic and relevant waveforms expl a Fly-Back dc-dc converter in con e an expression to estimate the output	ain the tinuous voltage	(05)
2B.	A SEPIC circuit has an i of 6 V. The load resistant kHz. Determine values of current is 40 percent of and C_2 such that the values	nput voltage of 15 V and is to have an nce is 2Ω , and the switching frequency of L_1 and L_2 such that the variation in in the average value. Determine value riation in capacitor voltage is 2 percention	output is 250 nductor s of C_1 t.	(05)
3A.	A forward converter has = $N1/N3 = 1$, $L_m = 1m$ 0.35. The switching fr voltage and b) peak cur	the following parameters: Vg = 100 V, H, Lx = 70 μ H, R = 20 Ω , C = 33 μ F a requency is 150 kHz. Determine a) rrent in L _m in the transformer model.	N1/N2 nd D = output	(03)
3B.	The Zero voltage switch Resonant inductor and 5A. Determine the swit is 10V.	h DC-DC converter has input voltage capacitor is 1µH, 0.047µF and load cu ching frequency such that the output	of 20V. rrent is voltage	(03)

3C.	With the help of neat circuit diagram and waveform explain the Push- Pull dc-dc converter. Derive an expression to estimate the output voltage.	(04)
4A.	The Zero current switch DC-DC converter has input voltage of 12V and resonant capacitor and inductor is $0.1\mu F$ & $10\mu H$, the load current is 1A and operating switching frequency is 100kHz.Determine the peak current in L_r and peak voltage across $C_r.$	(03)
4B.	Explain the operation of series loaded resonant DC-DC converter using suitable circuit diagram and waveform, if witching frequency is greater than resonant frequency ($\omega_s > \omega_0$).	(05)
4C.	Draw the waveforms for current through $L_{\rm r}$ and the voltage across the capacitor of a zero-voltage switched buck converter. Also, mark the various time instants	(02)
5A.	Discuss in detail the basic constraints for the design of a high frequency inductor when the core geometrical factor Kg method is employed for the design.	(04)
5B.	With the help of block schematic develop a canonical circuit model of converter with step by step procedure.	(04)
5C.	Explain, why soft switching is more preferred in present power supply design.	(02)