

VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

END SEMESTER ON-LINE PROCTORED EXAMINATIONS

DECEMBER 2021

MODERN POWER CONVERTER [ELE 4085]

REVISED CREDIT SYSTEM

Time:	75 Minutes + 10 Minutes Date: 17 December 2021 Max.	Marks: 20
Instruc	 tions to Candidates: Answer ALL the questions. Missing data may be suitably assumed. Time: 75 minutes for writing + 10 minutes for uploading. 	
1A.	A cuck converter has the following parameters the source voltage is 20V and output voltage is 10V and switching frequency is 100Khz, $L1=L2=2mH$ C1=10µF the output power is 10 watts Calculate the percentage error in assuming constant voltage across C1.	e 5 5 (04)
1B.	The current fed converter has an input voltage of 30V and supplies a load of 250W and load resistance is 10Ω . Specify a transforme turns ratio and a switch duty ratio is 0.4. Determine the average current in the inductor and determine the maximum voltage across each switch.	s r s (03)
1C.	Design a fly back converter to produce an output of 36 V from a 3.3 V source. The output current is 0.1 A and the turns ratio N2/N3 is 16. The magnetizing current ripple should not exceed 40% o the average and the output voltage ripple to be limited to 2% Assume continuous current mode, ideal components and switching frequency of 100 kHz.	a L f (03)
2A.	Design Explain the small-signal ac model of the buck-boos converter into canonical form with step by step procedure.	t (04)
2B.	A series loaded resonant dc-dc converter has the following parameters: $V_g = 10 \text{ V}$, $L_r = 6 \mu\text{H}$, $C_r = 6 \text{ nF}$, $f_s = 900 \text{ kHz}$, $R = 10 \Omega$. Determine the output voltage and normalized switching frequency and the value of the quality factor Q.)) (03)
2C.	Design a series- parallel loaded resonant dc-dc Converter with the following parameters source voltage is 100V and $C_p = C_s = 0.1 \mu F$ L=100 μ H, load resistance is =10 Ω switching frequency is 60kHz The output filter components L ₀ and C ₀ are assumed to produce a ripple free output. Justify the output voltage of the converter. Refe Fig.Q.2C.	e



Fig. Q.2C.