Name:

Enrolment No:

UPES
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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online Supplementary Examination, January 2021

Course: Electronics System Design **Semester: I**
Program: M. Tech Automation and Robotics **Time 03 hrs.**
Course Code: ECEG 7001 **Max. Marks: 100**

Instructions:

1. Attempt all questions as per the instruction.
2. Assume any data if required and indicate the same clearly.
3. Unless otherwise indicated symbols and notations have their usual meanings.
4. Strike off all unused blank pages

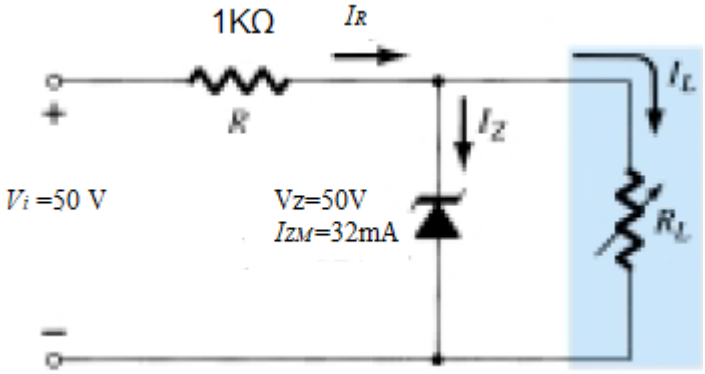
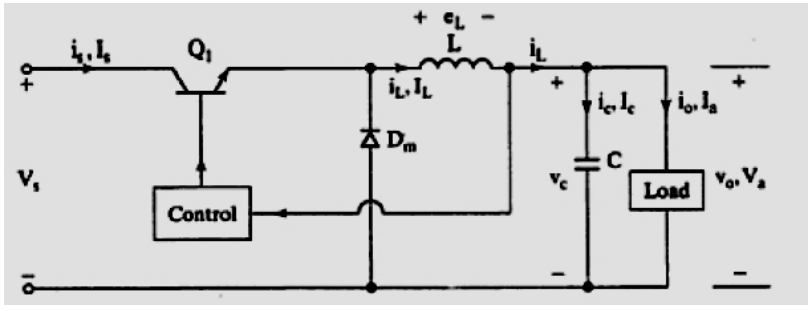
SECTION A **(6x5=30 M)**

S. No.	**Write only answer in the text box(for S.No:4 &5 write ONLY the final answer)**	**Marks**	**CO**
Q1.	Write about the UPS functions and mention the peculiar behavior of Online UPS.	**5**	**CO 1**
Q2.	Define the latching and holding current for SCR and give some applications of SCR?	**5**	**CO 2**
Q3.	Write about the applications of PLL in communications network.	**5**	**CO 3**
Q4.	Why Darlington pairs are used in the design of ULN 2003/2004 series of Driver ICs.[diagram not required] .Calculate the coil current in ULN 2803 is the coil voltage VSUP =40V coil resistance=2.8KΩ, and output low voltage (V_{OL} or $V_{CE(SAT)}$=0.7V.	**5**	**CO 3**
Q5.	Write about the shielding effectiveness and calculate total shielding effectiveness of a solid conducting barrier can be expressed as the sum of the reflection loss, α_R =10(dB), absorption loss, α_A =2(dB) and internal reflection losses, α_{IR}=2.5 (dB).	**5**	**CO 4**
Q6.	What are PCBs and describe the steps to design the circuits on PCB?	**5**	**CO 4**

SECTION B **5x10=50M**

Write answers, scan and upload.

Q7.	(a) For the network of Fig. 1 determine the range of R_L and I_L that will result	**5+5**	**CO 1**

	in V_{RL} being maintained at 10 V. (b) Determine the maximum wattage rating of the diode.  Fig 1		
Q8.	Design a Stepper motor using ULN2003 Driver IC , which can have Supply Volts: 5-12VDC Maximum Current per output = 500mA .[number of steps for revolution of your choice].	**10**	**CO2**
Q9.	Describe dual slope A/D converter working. Describe the operational difference between dual slope and quad slope A/D converter .	**5+5**	**CO 3**
Q10.	,a)Describe various Grounding, techniques employed in the Data Acquisition systems. b)Explain the difference between four wire and two wire transmitters. .	**7+3**	**CO 3**
Q11.	Describe the PCB design rules for Digital, High Frequency circuits in the PCB fabrication.	**10**	**CO 4**
	SECTION-C **Write answers, scan and upload.**		**1X20=20M**
Q12.	The buck regulator shown below has an input voltage of Vs = 12 V. The required average output voltage Va = 5.5V and R = 550 Ω and peak to peak ripple voltage is 25 mV. If the switching frequency is 25k kHz and peak to peak ripple current of inductor I limited to 0.85 A , then determine [Fig 2]  [Fig 2]	**20**	**CO 4**

	a) Duty cycle, k b) Filter inductance L c) Filter capacitor C d) Critical values of C and L **(Or)**		
	a)Describe the Sample and Hold circuit working with N-MOSFET and with OP AMP and design the same for a 10μS for the 300Ω N-MOSFET b)Design a decoder circuit using external components with IC7447 to display "ARE".	20	