GLOBAL ACADEMY OF TECHNOLOGY

(Autonomous Institution, Affiliated to VTU)

SEE MODEL QUESTION PAPER-I

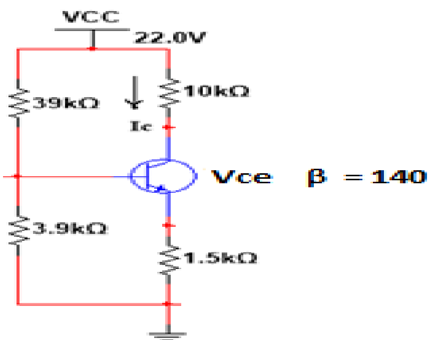
UG

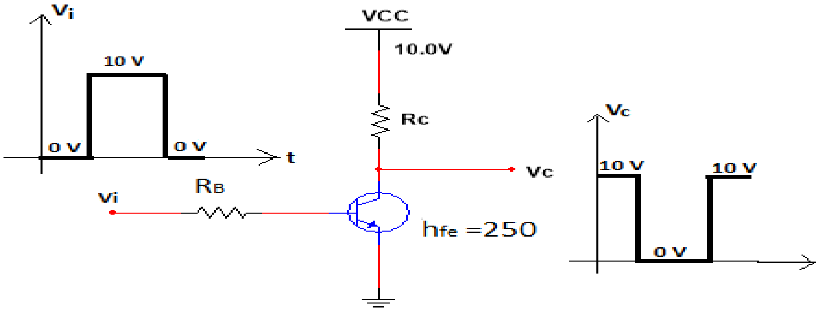
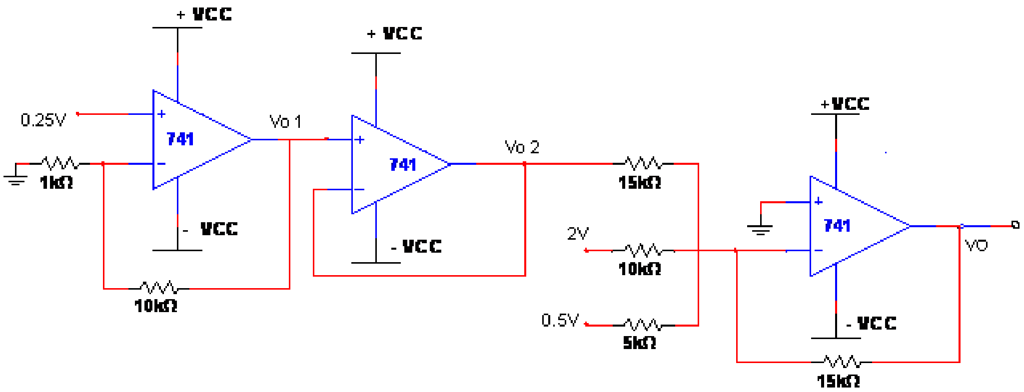
First Semester B.E. Degree Examination, April - 2021

Elements of Electronics Engineering

Time: 3 hrs. **Course Code: 20ELN16** **Max. Marks: 100**

***Note: Answer any Five full questions, choosing ONE full question from each module*.**

Q. No.		**MODULE - 1**	Marks
1	a.	Explain the operation of a PN Junction diode under forward and reverse biased conditions with the help of VI characteristics.	8
	b.	Discuss the working of Half wave rectifier with circuit diagram and waveforms. Show that efficiency of half wave rectifier is 40.6 %.	7
	c.	Design Zener voltage regulator for the following specifications: Input Voltage=10V±20%, Output Voltage= 5V, I_L= 20mA, I_Z min = 5mA and I_Z max= 80mA.	5
		OR	
2	a.	Discuss DC load line of a PN Junction diode.	6
	b.	A Half wave rectifier uses a transformer with turns ratio 2:1, the load resistance is 500Ω If the primary voltage is 240 V. Calculate peak inverse voltage and Dc Voltage	7
	c.	What is the need for a capacitive filter? Explain Full wave rectifier with capacitor filter.	7
		MODULE - 2	
3	a.	Explain the working and frequency response of an RC- Coupled amplifier.	7
	b.	Determine the dc bias voltage V_{CE} and the current I_c for the voltage divider configuration of Figure 3(b).  Fig. 3(b)	6
	c.	Discuss the working principles of RC- phase shift oscillator using BJT.	7
		OR	
4	a.	Determine R_B and R_C for the transistor inverter shown in Fig. 4(a) if I_{Csat} = 10mA	7

	b	 Fig. 4(a). Explain Colpitts oscillator with circuit diagram and write the expression for the frequency of oscillation.	6
	c	Explain the working of fixed bias circuit and also obtain the expressions for I_B and V_{CE}.	7
		MODULE - 3	
5	a.	Obtain an expression for the output voltage of an Inverting Amplifier using Op-amp and find the output voltage of a inverting amplifier with Vin = 2 V, Rf = 500 kΩ and R1 = 100 kΩ.	5
	b.	Find the output voltage for the circuit shown in Fig. 5 (b).  Fig. 5 (b)	4
	c.	Define the following terms with respect to Op-Amp and mention the typical values for IC 741 Op-Amp (i) CMRR (ii) Slew rate (iii) Input Bias Current (iv) Supply Voltage Rejection Ratio.	8
		OR	
6	a.	Explain the working principle of Inverting Schmitt Trigger with input and output waveforms.	7
	b.	Design an adder circuit using Op-amp to obtain an output voltage of V0 = -[$2V_1$ + $3V_2$+$5V_3$]. Assume R_f = 10kΩ.	7
	c.	Explain zero crossing detector using Op-amp and sketch the input and output waveforms	6
		MODULE - 4	
7	a.	Perform the following operations: i) $(BCDE)_{16} \rightarrow (\ ? \ )_2 \rightarrow (?)_{10}$ ii) $(526.44)_{10} \rightarrow (?)_2 \rightarrow (?)_{16}$ iii) $(10111101.0101)_2 \rightarrow (?)_{10} \rightarrow (?)_{16}$	6
	b.	Deduce a Full adder using two half adders and write the truth table and logical expressions.	7
	c	Explain the working of an SR flip-flop with logic diagram and truth table.	7

		OR	
8	a. b. c. d.	Perform 1's and 2's Complement Subtraction for $(28)_{10} - (47)_{10}$. Implement 4:1 Multiplexer using logic gates. Explain the working of a JK flip-flop with help of Truth table. List the Comparison between Combinational and Sequential logic Circuits.	5 5 5 5
		MODULE - 5	
9	a. b. c.	What is amplitude modulation? Deduce an expression for transmitted power in terms of carrier power. What is modulation and explain the need for modulation. A carrier of 1 MHz with 400 watts of its power is amplitude modulated with a sinusoidal signal of 2500 Hz. The depth of modulation is 75%. Calculate the sideband frequencies, the band width, the power in the side bands and the total power in the modulated wave.	7 6 7
		OR	
10	a. b. c.	Explain the block diagram of basic Communication System. Discuss different types of Electronic Communication. A 100 MHz carrier wave is frequency modulated by a 10Khz sinusoidal modulating signals. If the maximum frequency deviation is 50KHz. find the modulation index.	7 7 6