FOURTH SEMESTER DIPLOMA EXAMINATION IN ENGINEERING
AND TECHNOLOGY

LINEAR INTEGRATED CIRCUITS

MODEL QUESTION PAPER – SET-1

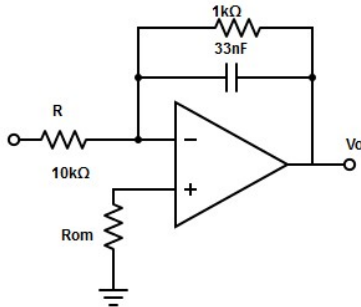Time: 3 hours   Maximum Marks: 75

PART A

I.   **Answer all the following questions in one word or sentence.**

(9 x 1 = 9 Marks)

Module Outcome   Cognitive level

		Module Outcome	Cognitive level
1	Define slew rate	M1.03	R
2	Draw the equivalent circuit of an operational amplifier.	M1.02	U
3	Determine the lower frequency limit of integration for the circuit given below.	M2.02	U
4	Why the control terminal (pin 5) of 555 timer IC is normally connected to ground through a capacitor of value 0.01µF.	M3.01	R
5	Why NE555 IC got its name?	M3.01	R
6	Define Lock range in PLL.	M3.03	R
7	Define the term settling time related to DAC	M4.03	R
8	Define resolution of ADC.	M4.02	R
9	Draw the pin out of IC7805.	M4.01	R

PART B

II.   **Answer any Eight questions from the following**

(8 x 3= 24 Marks)

Module Outcome   Cognitive level

		Module Outcome	Cognitive level
1	A 741C op-amp is used as an inverting amplifier with a gain of 50. The voltage gain vs frequency curve of 741C is flat upto 20kHz.What maximum peak to peak input signal can be applied without distorting the output.	M1.04	A

2	With the help of a circuit diagram explain the working of a differential amplifier if the following inputs are applied 　(i)　　V_{b1}=0V, V_{b2}=1V 　(ii)　　V_{b1}=1V, V_{b2}=1V 　(iii)　V_{b1}= -1V, V_{b2}=1V	M1.01	A
3	List out the ideal characteristics of an op-amp.	M1.03	R
4	Draw and explain the working of a practical differentiator and analyze its frequency response.	M2.02	U
5	Discuss the principle of operation of NE565 PLL IC.	M3.03	U
6	A 555 timer is configured in astable mode with R_A=2 kΩ, R_B=6 kΩ and C = 0.1 µF. Determine the frequency of oscillation.	M3.02	A
7	Draw the internal block schematic of NE555 IC.	M3.01	U
8	Draw and explain a 4-bit weighted resistor DAC.	M4.03	U
9	Compare the 78XX and 79XX fixed voltage regulators.	M4.01	U
10	With a neat diagram explain the working of Flash ADC.	M4.02	U

PART C

III. Answer all questions from the following　　(6x 7 = 42 Marks)

Module Outcome　Cognitive level

1	List and explain the function of all the basic building blocks of an op-amp.	M1.02	U
	OR		
2	Draw and explain the circuit of non-inverting amplifier. Also derive the expression for its closed loop voltage gain.	M1.04	U
3	Design a second order Butterworth low-pass filter with an upper cut-off frequency of 1kHz	M2.05	A
	OR		
4	Design the circuits to obtain the following output 　(i)　　$V_o = 5V_1 + 3V_2$ 　(ii)　　$V_o = -\frac{V_1+V_2+V_3}{3}$ 　(iii)　$V_o = -4V_1 - 6V_2$	M2.01	A
5	With the help of circuit diagrams and graphs, explain the working of a Full wave Precision rectifier.	M2.02	U
	OR		
6	Design a Schmitt Trigger with hysteresis width, V_H= 2V. Assume $\pm$ Vsat= $\pm$ 14V	M2.02	U
7	How to implement the instrumentation amplifier using three op-amp. Deduce the condition for ensuring high CMRR in the circuit?	M2.01	U

	OR		
8	Draw and explain op-amp based log and antilog amplifiers.	M2.01	U
9	With the help of block diagram explain the working of PLL. Explain any two applications of PLL.	M3.04	U
	OR		
10	With the help of circuit diagram and internal diagram, explain the working of a Low Voltage Regulator using IC723	M4.01	U
11	Explain the working of successive approximation ADC	M4.02	U
	OR		
12	Discuss how digital signal is converted into analog signal in a weighted resistor DAC.	M4.03	U