Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth semester B.Tech examinations (S), September 2020

Course Code: EC204
Course Name: ANALOG INTEGRATED CIRCUITS (AE, EC)

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks.

Marks

1	a)	How a constant current bias circuit can be used to improve the CMRR of a differential amplifier?	(7)
	b)	Define slew rate. What causes slew rate? Derive the equation for maximum input frequency at which an undistorted signal is obtained in terms of slew rate?	(8)
2	a)	Explain with suitable diagram how voltage shunt feedback is implemented in op-amp based circuits and derive the following characteristics (i) Closed loop voltage gain (ii)Input resistance, (iii) Output resistance (iv)Bandwidth	(12)
	b)	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.	(3)
3	a)	List and explain the function of all the basic building blocks of an op-amp.	(8)
	b)	What is the principle of operation of Wilson current mirror and its advantages? Deduce the expression for its output current.	(7)

PART B
Answer any two full questions, each carries 15 marks.

4	a)	Design a second order Butterworth low-pass filter with an upper cutoff frequency of 1kHz.	(7)
	b)	Explain the working of an inverting Schmitt trigger and draw its transfer characteristics.	(8)
5	a)	Draw the circuit of a temperature compensated logarithmic amplifier and show that it provides temperature independent logarithmic output.	(7)
	b)	Draw and explain the working of a practical differentiator and analyze its frequency response.	(8)

6 a) Derive the frequency of oscillation of an RC phase shift oscillator using op-amp. Also explain its working with suitable diagram. (8)

   b) Explain how a free running square wave form can be obtained using op-amps. (7)

PART C
Answer any two full questions, each carries 20 marks.

7 a) Explain how a monostable multivibrator can be implemented with 555 IC with relevant waveforms and functional diagram. Derive an expression for pulse width. (8)

   b) Give the block diagram of IC566 VCO and explain its operation. (6)

   c) Discuss in detail any two applications of PLL. (6)

8 a) Why is a current foldback protection circuit used in regulators? Explain with suitable diagrams. (8)

   b) Illustrate the principle of operation of PLL with its capture range and lock range. (7)

   c) Explain the working of successive approximation ADC. (5)

9 a) With a neat circuit diagram explain the working of a weighted resistor D/A converter. Discuss how digital signal is converted into analog signal in a weighted resistor DAC. (7)

   b) With a functional diagram, explain the principle of operation of Dual slope ADC. (8)

   c) Draw the circuit of a Schmitt trigger using 555 timer and explain its operation. (5)

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