

C.U.SHAH UNIVERSITY

Winter Examination-2015

Subject Name: INTEGRATED CIRCUITS AND APPLICATIONS

Subject Code : 4TE04ICA1

Branch : B.TECH (IC/EEE/EE)

Semester : IV

Date :19/11/2015

Time : 2:30 To 5:30 pm

Marks : 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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Q-1 Answer following questions:

14

1. An ideal operational amplifier has
 - A. Infinite output impedance
 - B. Zero input impedance
 - C. Infinite bandwidth
 - D. All of the above
2. Another name for a unity gain amplifier is
 - A. Differential amplifier
 - B. Comparator
 - C. Single ended
 - D. Voltage follower
3. The open-loop voltage gain of an op-amp is the
 - A. External voltage gain the device is capable of
 - B. Internal voltage gain the device is capable of
 - C. Most controlled parameter
 - D. Same as the closed loop voltage gain
4. The output of an ideal integrator when square wave input is applied is
 - A. Sine wave
 - B. Triangular wave
 - C. Saw tooth wave
 - D. Cosine wave
5. A non-inverting closed loop op-amp circuit generally has a gain factor
 - A. Less than one
 - B. Greater than one
 - C. Equal to one
 - D. Of zero
6. Op-amp is a/an
 - A. Differential amplifier
 - B. Rectifier
 - C. Oscillator
 - D. All of the above



7. Op-amp uses
 - A. Only positive voltage
 - B. Only negative voltage
 - C. Dual supply
 - D. None of the above
8. Virtual ground of an op-amp means
 - A. Inverting terminal is directly grounded
 - B. Inverting terminal is not directly grounded but assumed to be grounded due to another terminal is grounded and due to op-amp properties
 - C. A and B both
 - D. none
9. Op-amp uses
 - A. Negative feedback
 - B. Positive feedback
 - C. No feedback
 - D. A and B both
10. Slew rate is defined as
 - A. Maximum rate of change of output voltage with time
 - B. Minimum rate of change of output voltage with time
 - C. Maximum rate of change of output voltage with supply voltage
 - D. Minimum rate of change of output voltage with supply voltage
11. Op-amp used as high-pass and low-pass circuits employ which configuration?
 - A. Differential
 - B. Inverting
 - C. Non-inverting
 - D. Comparator
12. In order for an output to swing above and below zero reference, the op-amp requires
 - A. Resistive feedback network
 - B. Zero offset
 - C. Wide bandwidth
 - D. Positive and negative supply
13. Practical op-amp integrator circuit uses
 - A. Capacitor as feedback element
 - B. Resistor as feedback element
 - C. Capacitor and resistor in parallel as feedback circuit
 - D. Capacitor and resistor in series as feedback circuit
14. With a differential gain of 50,000 and a common-mode gain of 2, the CMRR is
 - A. -87.9 dB
 - B. -43.9 dB
 - C. 43.9 dB
 - D. 87.9 dB

Attempt any four questions from Q-2 to Q-8

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| Q-2 | <ol style="list-style-type: none"> a) Draw and explain the current mirror circuit with necessary derivations. b) What is ideal voltage transfer curve? Explain with necessary figure. Also explain the significance of CMRR. | <p>07</p> <p>07</p> |
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Q-3	a)	Derive the equation of closed loop voltage gain for voltage series feedback amplifier.	07
	b)	What is frequency response? Define break frequency and bandwidth. Also explain the effect of negative feedback on frequency response of an op-amp.	07
Q-4	a)	Draw and explain AC amplifiers with single supply voltage with input and output waveforms.	07
	b)	Draw and explain the peaking amplifier with frequency response.	07
Q-5	a)	Draw and explain instrumentation amplifier.	07
	b)	Write a short note on: phase shift oscillator using op-amp	07
Q-6	a)	Draw the circuit of first order low pass butterworth filter and derive the equation of voltage gain of filter. Verify the operation of filter from gain magnitude.	07
	b)	Design a wide band-pass filter with $f_L = 200$ Hz, $f_H = 1$ KHz, and a pass band gain of 4.	07
Q-7	a)	Explain the working of Schmitt trigger circuit with waveforms.	07
	b)	Draw and explain ideal integrator. How the low-frequency roll off problem can be solved?	07
Q-8	a)	Explain the working of astable multivibrator circuit using 555 timer.	07
	b)	Write a short note on: phase locked loops	07

