

# C.U.SHAH UNIVERSITY

## Summer Examination-2016

**Subject Name: Integrated Circuits & Applications**

**Subject Code: 4TE04ICA1**

**Branch: B.Tech (EEE,EE,IC)**

**Semester: 4 Date: 10/05/2016 Time: 02:30 To5:30**

**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 Attempt the following questions: (14)**

- a) If ground is applied to the ( + ) terminal of an inverting op-amp, the ( — ) terminal will  
(a)Not need an input resistor (b)Be virtual ground (c)Have high reverse current (d)Not invert the signal
- b) When a step-input is given to an op-amp integrator, the output will be  
(a) a ramp. (b) a sinusoidal wave. (c)a rectangular wave. (d)a triangular wave with dc bias.
- c) The two input terminals of an op-amp are labeled as  
(a)High and low (b)Positive and negative (c)Inverting and non inverting (d) Differential and non differential
- d) For an op-amp having differential gain  $A_v$  and common-mode gain  $A_c$  the CMRR is given by  
(a) $A_v + A_c$  (b) $A_v/A_c$  (c) $1 + (A_v/A_c)$  (d) $A_c/A_v$
- e) What is the voltage gain of the unity follower?  
(a) 0 (b) 1 (c) -1 (d) infinity
- f) For what kind of input signal, the frequency divider can be avoided frequency multiplier?  
(a)Triangular waveform (b) Square waveform (c) Saw tooth waveform (d) Sine waveform
- g) In VCO IC 565, the value of charging & discharging is dependent on the voltage applied at \_\_\_\_\_.  
(a) Triangular wave output (b) Square wave output (c)Modulating input (d) All of the above
- h) Specified value of CMRR for 741 op-amp is \_\_\_\_\_.  
(a) 30 dB (b) 40 dB (c) 90 dB (d) 0dB
- i) How many op-amps are required to implement this equation  $V_o = V_1$   
(a)3 (b)2 (c)1 (d)4



- j) The closed-loop voltage gain of an inverting amplifier is equal to
  - (a)The ratio of the input resistance to feedback resistance
  - (b)The open-loop voltage gain
  - (c)The feedback resistance divided by the input resistance
  - (d)The input resistance
- k) Hysteresis is desirable in Schmitt-trigger, because
  - (a) Energy is to be stored/discharged in parasitic capacitances.
  - (b) Effects of temperature would be compensated.
  - (c) Devices in the circuit should be allowed time for saturation and desaturation.
  - (d)it would prevent noise from causing false triggering
- l) An ideal OP-AMP is an ideal
  - (a)Current controlled Current source
  - (b)Current controlled voltage source
  - (c)Voltage controlled voltage source
  - (d)voltage controlled current source
- m) Differential amplifiers are used in
  - (a)instrumentation amplifiers
  - (b)voltage followers
  - (c)voltage regulators
  - (d)buffers
- n) Define: PSRR

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

- Q-2 Attempt all questions (14)**
- (a) What is op-amp? Draw and explain the block diagram representation of a typical Op-amp. (07)
  - (b) Draw & explain Current Mirror Circuit. (07)
- Q-3 Attempt all questions (14)**
- (a) Draw and explain the Block Diagram of IC 555 Timer. (05)
  - (b) Explain the differences between DC and AC amplifier. (05)
  - (c) Explain the Interfacing TTL to CMOS. (04)
- Q-4 Attempt all questions (14)**
- (a) Define: 1) Input Bias Current 2) CMRR 3) Slew rate 4) Input offset current 5) Input offset voltage (05)
  - (b) Explain the Block Diagram and operation of PLL. (05)
  - (c) Explain Phase shift oscillator. (04)
- Q-5 Attempt all questions (14)**
- (a) Explain the Practical integrator circuit. Explain its advantages. (07)
  - (b) Draw and explain Differential input Differential output amplifier. (07)
- Q-6 Attempt all questions (14)**
- (a) Design a differentiator to differentiate an input signal that varies in frequency from 10 Hz to about 500Hz.If a sine wave of 2V Peak at 500Hz is applied to the differentiator, write expression for its output and draw output waveform. (07)
  - (b) Explain Basic Inverting Schmitt trigger circuit with input & output waveforms. (07)
- Q-7 Attempt all questions (14)**
- (a) Compare Butterworth filter with Chebychev Filters. (07)
  - (b) Explain the working of inverting summer with suitable example. (07)
- Q-8 Attempt all questions (14)**
- (a) Explain the frequency shift keying circuit using PLL. (05)
  - (b) Explain Voltage to current converter with floating load with one application. (05)
  - (c) Describe Zero Crossing Detectors. (04)

