Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Winter Examination-2019

Subject Name: Integrated Circuits & Applications

Subject Code: 4TE04ICA1 Branch: B.Tech (Electrical)

Semester: 4 Date: 13/09/2019 Time: 02:30 To 05:30 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.

Q-1 Attempt the following questions: (14)

1) Draw the ideal voltage transfer curve an op-amp.

2) Draw the pin diagram of 741 IC

3) List the characteristics of an ideal op-amp.

4) Give any four non linear applications of operational amplifier.

5) What is the effect of negative feedback on the input resistance of an inverting amplifier?

6) Draw the ideal gain versus frequency response of wide band pass filter.

7) Draw the pin diagram of 555 IC.

8) The gain of an ideal opamp is _____. (Zero/Infinite)

9) The type of feedback applied to the schmmit trigger circuit is_____(Positive/ Negative).

10) Give any four advantages of negative feedback.

11) Give the types of multivibrator circuits.

12) A summing amplifier is a linear application of an op-amp. Determine whether the given statement is TRUE or FALSE.

13) Draw only the high frequency op-amp equivalent circuit.

14) The gain of a voltage follower circuit is _____.(One/Zero)

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

Q-2 **Attempt all questions** **(14)**

(a) Draw the circuit diagram of non-inverting amplifier with negative feedback and derive the following equations. **07**

a) Closed Loop Voltage Gain b) Output Resistance with Feedback

(b) Draw the circuit diagram of differential opamp in open loop configuration and explain its operation. Derive the following equation for voltage gain. **07**

Q-3 **Attempt all questions** **(14)**

(a) Draw the circuit diagram of differential amplifier with one op-amp and derive the following equations. **07**

a) Closed Loop Voltage Gain b) Input Resistance with Feedback

(b) Explain the following application of Low Voltage DC Voltmeter for voltage to current (V-I) converter with floating load **07**

Q-4 **Attempt all questions** **(14)**

(a) Draw the circuit diagram of zero cross detector circuit and explain its operation with necessary waveforms. **07**

(b) Draw the circuit diagram of op-amp half wave rectifier circuit and explain its operation with necessary waveforms. **07**

Q-5 **Attempt all questions** **(14)**

(a) Drerive the equation for duty cycle and switching frequency of output voltage for a Astable multivibrator. **07**

(b) Draw the circuit diagram of RC phase shift oscillator and explain its operation with necessary conditions for oscillations. **07**

Q-6 **Attempt all questions** **(14)**

(a) Draw the high frequency equivalent circuit of an op-amp and show that open loop gain is a function of frequency. Draw the gain versus frequency response.

(b) Draw the circuit diagram of summing amplifer in the inverting configuration and derive the equation of output voltage.

Q-7 **Attempt all questions** **(14)**

(a) The 741 IC op-amp having the following parameter is connected as a inverting amplifier with $R_1 = 470\Omega$ and $R_F = 4.7K\Omega$: **07**

Open Loop Gain $A = 400{,}000$ Input Impedance $= 33M\Omega$

Output Impedance $R_o = 60\Omega$ Unity Gain Bandwidth $f_o = 0.6MHz$

Compute: i) Gain with Feedback A_F

ii) Input Impedance with Feedback R_{iF}

iii) Output Impedance with Feedback R_{OF}

iv) Bandwidth with Feedback f_F

(b) Draw the circuit digram of op-amp negative clipper circuit and explain its operation with necessary waveforms **07**

Q-8 **Attempt all questions** **(14)**

(a) Draw the circuit diagram of first order high pass filter circuit and explain its operation. Draw the response gain versus frequency. **07**

(b) Draw the circuit diagram of first order low pass filter circuit and explain its operation. Draw the response gain versus frequency. **07**