Enrollment No: _____   Exam Seat No: _____

C. U. SHAH UNIVERSITY
Winter Examination-2022

Subject Name: Integrated Circuits & Applications

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

Semester: 4   **Date: 20/09/2022**   **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)**
  a) An IC contains--------------?
       a) Passive elements
       b) Active elements
       c) Both Passive and active elements
       d) None of the above
  b) The most complicated component fabricated on IC is -------?
       a) Diode
       b) Resistor
       c) Transistor
       d) Conductor
  c) The full form of the SSI is?
       a) Small scale industries
       b) Small scale integration
       c) Surface scale integration
       d) Small surface integration
  d) Which is not the internal circuit of operational amplifier?
       a) Differential amplifier
       b) Level translator
       c) Output driver
       d) Clamper
  e) The purpose of level shifter in Op-amp internal circuit is to
       a) Adjust DC voltage
       b) Increase impedance
       c) Provide high gain
       d) Decrease input resistance
  f) The input impedance of a voltage follower circuit is very____(High/Low)
  g) A differential amplifier is capable of amplifying
       a) DC input signal only
       b) AC input signal only
       c) AC & DC input signal

d) None of the Mentioned

h) In ideal Differential Amplifier, if same signal is given to both inputs, then output will be
a) Same as input
b) Double the input
c) Not equal to zero
d) Zero

i) What is the general information specified in ordering an IC?
a) Temperature range
b) Device type
c) Package type
d) All of the mentioned

j) Decibel is the unit of _____gain. (a) Voltage (b) Current (c) Power (d) All

k) Which circuit is used for obtaining desired output waveform in operational amplifier?
a) Clipper
b) Clamper
c) Peak amplifier
d) Sample and hold

l) The clipping level in op-amp is determined by
a) AC supply voltage
b) Control voltage
c) Reference voltage
d) Input voltage

m) In practical application of current mirror, early voltage is assumed to be
a) Infinite
b) Zero
c) Unity
d) None of the mentioned

n) Which circuit is used as active load for an amplifier
a) Wildar Current source
b) Darlington pair
c) Current Mirror
d) All of the mentioned

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

Q-2	**Attempt all questions**	**(14)**
(a)	Draw the circuit diagram of differential amplifier with one op-amp and derive the following equations. a) Closed Loop Voltage Gain b) Input Resistance with Feedback.	**(7)**
(b)	State the characteristics of an ideal opamp .	**(7)**
Q-3	**Attempt all questions**	**(14)**
(a)	State the name of any five parameters those are listed on opamp data sheet. Explain any two.	**(7)**
(b)	Draw the pin diagram of opamp 741 C. Explain the function of each.	**(7)**

Q-4		**Attempt all questions**	**(14)**
	(a)	Derive the equation of closed loop voltage gain for inverting configuration with feedback.	**(7)**
	(b)	Briefly discuss about the following: (a) Gain bandwidth product (b) Slew rate (c) Common mode rejection ratio.	**(7)**

Q-5		**Attempt all questions**	**(14)**
	(a)	State and explain equivalent circuit of an opamp.	**(7)**
	(b)	Discuss the operation of summing amplifier using opamp.	**(7)**

Q-6		**Attempt all questions**	**(14)**
	(a)	Draw the circuit diagram of instrumentation amplifier using transducer bridge and explain how it can be used to measure the physical quantity.	**(7)**
	(b)	Discuss the operation of integrator using opamp.	**(7)**

Q-7		**Attempt all questions**	**(14)**
	(a)	Discuss the operation of 555 timer in astable mode.	**(7)**
	(b)	Draw the circuit digram of op-amp negative clipper circuit and explain its operation with necessary waveforms	**(7)**

Q-8		**Attempt all questions**	**(14)**
	(a)	Draw the high frequency equivalent circuit of an op-amp and explain that open loop voltage gain of an op-amp is a function of frequency.	**(7)**
	(b)	Draw the circuit diagram of first order low pass filter and explain its operation.	**(7)**