Enrollment No: _____ Exam Seat No:_____

C. U. SHAH UNIVERSITY

Winter Examination-2019

Subject Name: Linear Electronics

Subject Code: 4TE03LNE1 **Branch: B.Tech (CE)**

Semester : 3 **Date : 18/11/2019** **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)**

a) Why BJT called as bipolar devices?
b) Why collector region is thicker than emitter region?
c) What do you mean by faithful amplification?
d) Define the term Q-Point of transistor.
e) Define the term Thermal Runaway.
f) Define the term Stability Factor.
g) Define the term Cross Over Distortion.
h) Define the term virtual ground
i) Define the term slew rate w.r.to. Op-Amp.
j) Define the term CMRR w.r.to. Op-Amp.
k) Define the term Input Offset Voltage w.r.to. Op-Amp.
l) Define the term Output Offset Voltage w.r.to. Op-Amp.
m) Define the term positive feedback.
n) Define the term negative feedback.

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

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

a) Derive the equation for α in terms of β and β in terms of α. Calculate the value of I_E and α in a transistor for which $\beta = 50$ and $I_B = 20\mu A$. **08**

b) Derive the relationship between leakage currents (I_{CBO} and I_{CEO}) in terms of α and β. The collector leakage current in a transistor is 2.4 μA in CB arrangement. If now the transistor is connected in CE arrangement, what will be the leakage current? Given that $\beta = 120$. **06**

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

a) A transistor is connected in CE configuration in which collector supply is 8V and the voltage drop across resistance R_C connected in the collector circuit is 0.5V. The value of $R_C = 800\Omega$. If $\alpha = 0.96$, determine V_{CE} and I_B. **05**

b) How will you draw dc load line on the output characteristics of a transistor? What is its importance? In a CE transistor circuit, if $V_{CC} = 12V$ and $R_C = 6K\Omega$, draw the dc load line. What will be the Q-point if zero signal base current is $20\mu A$ and $\beta = 50$? **09**

Q-4		**Attempt all questions**	**(14)**
	a)	Explain in detail voltage divider biasing technique with circuit diagram.	**07**
	b)	Draw the h-parameter equivalent circuit of Common Emitter Amplifier circuit and derive the expression for input impedance, output impedance, voltage gain and current gain.	**07**
Q-5		**Attempt all questions**	**(14)**
	a)	Explain with a diagram, the working of a transformer coupled class AB power amplifier.	**07**
	b)	Explain with a diagram, the working of a class C power amplifier.	**07**
Q-6		**Attempt all questions**	**(14)**
	a)	Derive the formula of voltage gain for op-amp inverting and non-inverting amplifier.	**07**
	b)	Explain in detail integrator using Op-Amp with neat circuit diagram.	**07**
Q-7		**Attempt all questions**	**(14)**
	a)	Explain in detail voltage shunt feedback amplifier with circuit diagram.	**07**
	b)	Explain with the help of circuit diagram working of RC phase shift oscillator.	**07**
Q-8		**Attempt all questions**	**(14)**
	a)	Explain in detail current shunt feedback amplifier with circuit diagram.	**07**
	b)	Explain with the help of circuit diagram working of crystal oscillator.	**07**