Enrollment No: _____ Exam Seat No:_____

C. U. SHAH UNIVERSITY
Winter Examination-2021

Subject Name: Linear Electronics

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

Semester: 3 Date: 11/01/2022 Time: 11:00 To 02:00 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) A transistor has _____ PN junctions.
A) 1 B) 2 C) 4 D) 3

b) The element that has the smallest size in a transistor is _____.
A) Collector B) Base C) Emitter D) None

c) The collector of a transistor is _____ doped.
A) Moderately B) Lightly C) Heavily D) None

d) In a transistor, I_C = 100 mA and I_E = 100.5 mA. The value of α is _____.
A) 0.984 B) 0.995 C) 0.975 D) None

e) If the value of collector current I_C decreases, then value of V_{CE}.....
A) remains same B) decreases C) increases D) None

f) The operating point is also called the _____ point.
A) Cut-off point B) Saturation C) Quiescent D) None

g) If operating point is shifted towards ____ point then ___ cycle will clipped.
A)saturation, upper B) cut off ,lower C) mid-point D) both A and B

h) For faithful amplification by a transistor circuit, the value of V_{CE} should _____.
A) not fall below 1v B) 0v C) 0.2V D) none

i) The element that has the biggest size in a transistor is _____.
A) Collector B) Base C) Emitter D) None

j) In class A amplifier, the operating point …….. on d. c. load line.
A) Cut-off B) Middle C) Saturation D) None

k) Output resistance of an ideal op-amp ____.
A) high B) infinite C) zero D) medium

l) An open loop gain of an ideal op-amp _____.
A) high B) low C) infinite D) medium

m) In positive feedback phase difference between input and output is _____.
A) 0^0 B) 180^0 C) 360^0 D) Both A and C

n) Which oscillator has highest stability?
A) Colpitt's B) Hartley C) Crystal D) None

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 , I_C and α in a transistor for which $\beta = 100$ and $I_B = 30\mu A$. **07**

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 10 μA in CB arrangement. If now the transistor is connected in CE arrangement, what will be the leakage current? Given that $\beta = 200$. **07**

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

a) A transistor is connected in CE configuration in which collector supply is 10V and the voltage drop across resistance R_C connected in the collector circuit is 1.5 V. The value of $R_C = 500\Omega$. 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 $V_{CC} = 15V$ and $R_C = 6K\Omega$, draw the dc load line. What will be the Q-point if zero signal base current is $30\mu A$ and $\beta = 50$? **09**

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

a) What is faithful amplification? State and explain in detail basic conditions must be satisfied for faithful amplification. **07**

b) Explain in detail fixed base biasing technique with circuit diagram. **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 in detail with diagram inverting and non-inverting amplifier using Op-amp. **07**

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

a) Explain in detail summing amplifier using Op-Amp with neat circuit diagrams. **07**

b) Explain in detail Integrator using Op-Amp with neat circuit diagram. **07**

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

a) Draw and explain in detail current shunt feedback amplifier. **07**

b) Explain with the help of circuit diagram working of RC phase shift oscillator. **07**

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

a) Draw and explain in detail voltage series feedback amplifier. **07**

b) Explain with the help of circuit diagram working of colpitt's oscillator. **07**