Enrollment No: _____   Exam Seat No:_____

C. U. SHAH UNIVERSITY
Summer Examination-2020

Subject Name: Linear Electronics

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

Semester : 3   **Date : 29/02/2020**   **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) A transistor has........ pn junctions.
   A) 1   B) 2   C) 3   D) 4

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

c) The emitter 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 β is ....
   A) 100   B) 50   C) 200   D) None

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

f) The operating point is also called the........
   A) Cut-off point   B) Saturation point   C) Quiescent point   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) Transistor biasing represents........ Condition.
   A) ac   B) dc   C) Both ac and dc   D) None

i) The stabilization of operating point in potential divider method is provided by........
   A) R_E consideration B) R_C consideration   C) V_{CC} consideration   D) None

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

k) Input resistance of an ideal op-amp…………
   A) high   B) infinite   C) medium   D) low

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

m) In negative feedback phase difference between input and output is ……..
   A) 0   B) 180   C) 360˚   D) Both A and C

n) Which oscillator has highest stability?
   A) Colpitts   B) Hartley   C) Crystal   D) None

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

Q-2		**Attempt all questions**	**14**
	(a)	State different transistor connection circuits. Draw the CB circuit and derive the equation of current amplification factor α and collector current I_C. In a CB connection, α is 0.9. If the I_E is 1mA, determine the value of I_B.	**07**
	(b)	Derive the relationship between leakage currents (**I_{CBO} and I_{CEO}**) in terms of α and β. If $I_{CBO} = 0.2\ \mu A$, $I_{CEO} = 20\ \mu A$ and $I_C = 1mA$, find the value of α, β, I_E and I_B.	**07**
Q-3		**Attempt all questions**	
	(a)	Determine V_{CE} and V_{CB} in the transistor circuit shown in Figure below. The transistor is of silicon and has $\beta = 150$.	**07**
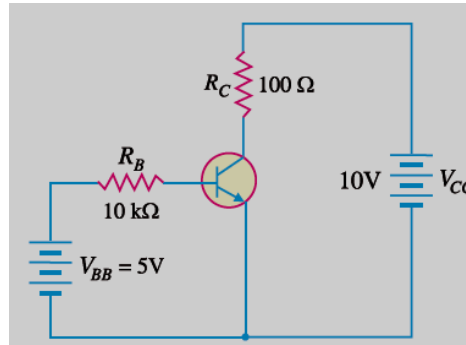
	(b)	Explain in detail dc load line and operating point with diagram for CE circuit. In CE circuit, if $V_{CC} = 12V$ and $R_C = 6\ k\Omega$, draw the dc load line. What will be the Q point if zero signal base current is $20\mu A$ and $\beta = 50$?	**07**
Q-4		**Attempt all questions**	
	(a)	What is faithful amplification? State and explain in detail with illustrations different conditions to be fulfilled to achieve faithful amplification in a transistor amplifier.	**07**
	(b)	Enlist different transistor biasing methods. Explain any one of them in detail with circuit diagram.	**07**
Q-5		**Attempt all questions**	
	(a)	Explain with a diagram, the working of a class B push-pull power amplifier.	**07**
	(b)	Derive the equation for overall gain for positive and negative feedback.	**07**
Q-6		**Attempt all questions**	
	(a)	Explain in detail inverting and non-inverting amplifier using Op-Amp with neat circuit diagrams.	**07**
	(b)	Explain in detail differentiator using Op-Amp with neat circuit diagram.	**07**
Q-7		**Attempt all questions**	
	(a)	Draw and explain in detail voltage series feedback amplifier.	**07**
	(b)	Explain with the help of circuit diagram working of crystal oscillator.	**07**
Q-8		**Attempt all questions**	
	(a)	Draw and explain in detail voltage shunt feedback amplifier.	**07**
	(b)	Explain with the help of circuit diagram working of Colpitts oscillator.	**07**