Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name: Analog Electronics Circuits

Subject Code: 4TE03AEC1 Branch: B.Tech (Electrical)

Semester: 3 Date: 22/03/2018 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) Average output voltage of full wave rectifier is _____than half wave rectifier.

A) Less than B) Greater than C) Equal to D) None of the above

2) Which one of the below IC is used to obtain +9 V constant voltage?

A) IC 7805 B) IC 7812 C) IC 7912 D) IC 7809

3) In a rectifier circuit, ripple factor_____with increase in the value of capacitor filter.

A) Remains Constant B) Decreases C) Increases D) None of the above

4) In a transistor series regulator circuit, zener diode is connected with _____ terminal of the transistor.

A) Collector B) Emitter C) Base D) None of the above

5) For a common emitter amplifier, h-parameter model, h_{ie} stands for _____

A) Output impedance B) Output Conductance
C) Input Conductance D) Input Impedance

6) Which one of the below amplifier configuration contains voltage gain and current gain greater than unity?

A) Common Emitter B) Common Base

C) Common Collector D) None of the above

7) If an amplifier is cascaded in two stages, gain of the stage 1 is Av_1 and gain of stage 2 is Av_2, then total gain of the amplifier is_____

A) Av_1 / Av_2 B) $Av_1 + Av_2$ C) $Av_1 \times Av_2$ D) $Av_1 - Av_2$

8) In an amplifier circuit, Q point of transistor is biased in which region?

A) Cut-off B) Active C) Saturation D) None of the above

9) The maximum efficiency of transformer coupled **class *A*** amplifier is_____

A) 25 % B) 40 % C) 80 % D) 50%

10) If a negative feedback is applied to the amplifier, the gain of amplifier due to feedback _____

A) Remains constant B) Increases C) Decreases D) None of the above

11) For a sinusoidal oscillator circuit, what is the Barkhausen criteria for oscillator circuit?

A) $\beta A < 1$ B) $\beta A = 1$ C) $\beta A = -1$ D) $\beta A = 0$

12) An input voltage $v_{in} = 50mV$ is applied at non-inverting terminal of the op-amp having open loop gain 200,000. What will be the output voltage?

A) 10,000 V B) -10,000 V C) 8000 V D) 8000 V

13) Which one of the below is a non-sinusoidal oscillator?

A) R-C phase shift oscillator B) Hartley oscillator

C) Multivibrator D) Wein-Bridge oscillator

14) For an ideal operational amplifier which one is the false statement?

A) Infinite input resistance B) Zero output resistance

C) Infinite Voltage Gain D) Zero input resistance

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

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

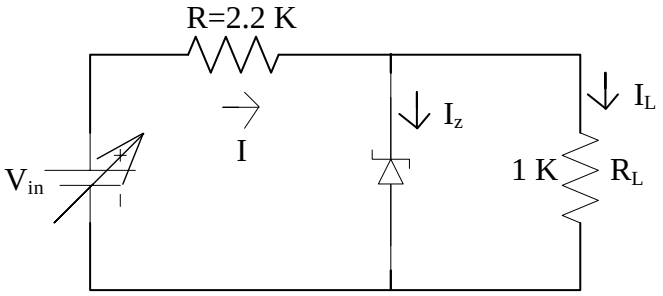
(a) Draw the circuit diagram and waveforms of full wave bridge rectifier. Explain its operation. **07**

(b) Explain the operation of zener shunt regulator with varying input voltage. [Line regulation] **07**

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

(a) For a zener regulator shown in the figure, calculate the range of input voltage for which output will remain constant. **07**

$V_z = 6.1\ V, I_{zmin} = 2.5\ mA, I_{zmax} = 25\ mA, r_z = 0\ \Omega.$



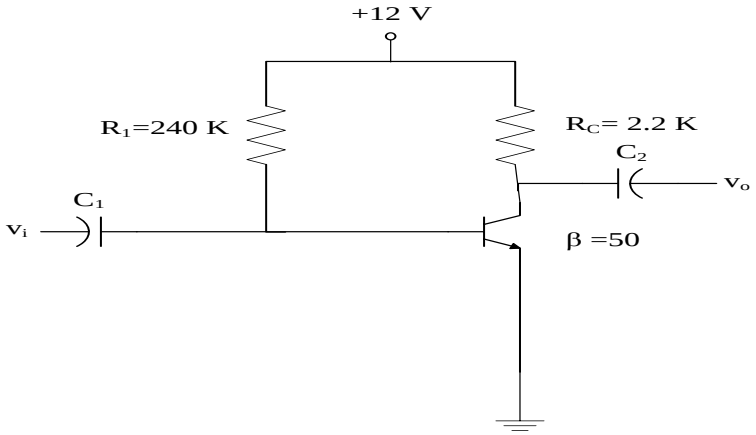
(b) Explain the fixed bias circuit for BJT. **07**

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

(a) Draw the h-parameters model for common emitter transistor and obtain h-parameters for the BJT. **07**

(b) Determine the following for the fixed bias configuration. **07**

i) I_{B_Q} ii) I_{C_Q} iii) V_{CE_Q}



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

(a) For series fed class A amplifier (Direct coupled class A amplifier) show that maximum efficiency is 25 %. **07**

(b) Draw the circuit of class B push-pull amplifier and explain its operation. Derive the equation of conversion efficiency class B push pull amplifier. **07**

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

(a) Explain reasons for applying negative feedback to the amplifier. **07**

(b) Explain the operation of RC phase shift oscillator and derive the condition $f = \frac{1}{2\pi\sqrt{3}RC}$ for sustained oscillations. **07**

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

(a) Draw the circuit diagram of Wein Bridge oscillator circuit and obtain the condition $f = \frac{1}{2\pi RC}$ for sustained oscillation. **07**

(b) Explain operating principle of sinusoidal oscillator and give Barkhausen criteria for oscillation. **07**

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

(a) List the characteristics of an ideal op-amp. **07**

(b) Explain the following amplifiers for open-loop configurations. **07**

i) Inverting amplifier ii) Non-inverting amplifier