C.U.SHAH UNIVERSITY
Summer Examination-2017

Subject Name: Analog Electronics Circuits

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

Semester: 3   **Date: 23/03/2017**   **Time: 10:30 To 01:30**   **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)   The efficiency of a half wave rectifier is_____

    A) 90 %   B) 81 %   C) 40.6%   D) 100 %

2)   In a zener shunt regulator circuit, the zener diode is connected in _____ with the load.

    A) Parallel   C) Either in series or parallel

    B) Series   D) None of the above

3)   A transistor operating as a common emitter amplifier takes the input signal from_____ terminal.

    A) Collector   C) Emitter

    B) Base   D) None of the above

4)   If two amplifiers are connected in series, the total gain of the amplifier is_____ of the individual gain.

    A) ProductB) Sum   C) Subtraction D) Division

5)   What one of this BJT biasing circuit is β (h_{fe}) independent?

    A) Voltage Divider Bias   (C)   Fixed Bias

    B)   Collector to Base Bias   (D) Both (I) and (III)

6)   If a negative feedback is applied to the amplifier bandwidth of the amplifier increases.

      A) True   B) False

7) 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

8) A 7805 regulated IC is used in a regulated power supply. It will provide_____ constant output voltage.

A) $+18\,V$ B) $+5\,V$ C) $-5\,V$ D) $-18\,V$

9) The Barkhausen criteria for oscillation in an oscillator circuit is $\beta A = $ _____

A) 0   B) < 1 C) $= 1\,V$ D) > 10

10) Which one of the below is an RC sinusoidal oscillator?

A) Clapp's   C) Hartley oscillator

B) Colpitt's   D) Wein-Bridge oscillator

11) The feedback used in oscillator is _____.

A) Negative   B) Positive   C) Both Positive and Negative   D) None of the above

12) The output impedance of an ideal op-amp is infinite.

(A) True   (B) False

13) The gain of the op-amp in open loop condition is_____

A) Very High   B) Zero   C) Very Low

14) For an open loop operational amplifier, if v_1 is the input voltage at non-inverting terminal and v_2 is the input voltage at inverting terminal, what will be the differential input voltage?

A) $v_1 + v_2$ (B) $\dfrac{v_1 - v_2}{2}$ (C) $\dfrac{v_1 + v_2}{2}$ (D) $v_1 - v_2$

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

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

(a) Draw the circuit diagram and waveforms of half wave rectifier and explain its operation.

07

(b) Derive the below equation for full wave bridge rectifier.

i) Average load current $I_{dc} = \dfrac{2I_m}{\pi}$, where $I_m = $ Maximum load current

ii) RMS Load current $I_{RMS} = \dfrac{I_m}{\sqrt{2}}$

07

Q-3		**Attempt all questions**	**(14)**
	(a)	Explain the operation of zener shunt regulator with varying input voltage (Line regulation)	**07**
	(b)	Draw the circuit diagram of series pass regulator and explain its operation.	**07**

Q-4		**Attempt all questions**	**(14)**
	(a)	Draw and explain the fixed bias circuit for BJT.	**07**
	(b)	Draw the h parameter model of common emitter transistor, explain various h parameters existing in the model.	**07**

Q-5		**Attempt all questions**	**(14)**
	(a)	Draw the circuit diagram of transformer coupledclass *A* amplifier and explain its operation.	**07**
	(b)	List the advantages of negative feedback in amplifier and explain any two of them.	**07**

Q-6		**Attempt all questions**	**(14)**
	(a)	Explain the theory of Barkhausen criteria for oscillation in an oscillator circuit.	**07**
	(b)	Draw the circuit diagram of RC phase shift oscillator, and derive the equation for frequency of oscillation $f = \frac{1}{2\pi RC \sqrt{3}}$.	**07**

Q-7		**Attempt all questions**	**(14)**
	(a)	Draw the circuit diagram of Colpitt's oscillator and explain its operation. Derive the equation for the frequency of oscillation.	**07**
	(b)	Draw the pin diagram of 741 IC op-amp and explain the function of each pin.	**07**

Q-8		**Attempt all questions**	**(14)**
	(a)	List the characteristics of an ideal op-amp.	**07**
	(b)	Explain the following modes of operational amplifier in open loop configuration. i) Inverting Amplifier.ii) Non inverting Amplifier.	**07**