

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-III(New) EXAMINATION – SUMMER 2016****Subject Code:2130902****Date:31/05/2016****Subject Name:Analog Electronics****Time:10:30 AM to 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 Short Questions 14**
- 1 Define Slew rate.
  - 2 Which of the following electrical characteristics is not exhibited by an ideal op-amp?  
(A) Infinite voltage gain (B) Infinite bandwidth  
(C) Infinite output resistance (D) Infinite slew rate
  - 3 Find the input voltage of an ideal op-amp. It's one of the inputs and output voltages are 2v and 12v. (Gain=3).  
(A) 8v (B) 4v (C) -4v (D) -2v
  - 4 Most of linear ICs are based on the two transistor differential amplifier because of its  
(A) Input voltage dependent linear transfer characteristic.  
(B) High voltage gain.  
(C) High input resistance.  
(D) High CMRR
  - 5 The speed response of Schmitt trigger is \_\_\_\_\_ than convention comparator.  
(A) Higher (B) Lower
  - 6 The arrowhead type symbol of Opamp signifies signal flow  
(A) From DC supply to output (B) From input to output  
(C) In reverse direction (D) None of the above
  - 7 The open loop gain of an ideal Opamp is  
(A) 0 (B)  $2 \times 10^5$  (C)  $\infty$  (D) 1
  - 8 What is PSSR?
  - 9 The Opamp is generally operated in the \_\_\_\_\_ mode for the amplifier application.  
(A) closed loop (B) open loop
  - 10 When a step-input is given to an op-amp integrator, the output will be  
(A) a ramp. (B) a sinusoidal wave.  
(C) a rectangular wave. (D) a triangular wave with dc bias.
  - 11 A bistable multivibrator is a  
(A) Free running oscillator.  
(B) Triggered oscillator.  
(C) Saw tooth wave generator.  
(D) Crystal oscillator.
  - 12 Explain the function of silicon dioxide layer in MOSFET.
  - 13 Define input offset voltage.

- 14 LM 317 is a  
 (A)Adjustable voltage regular  
 (B)Adjustable current regular
- Q.2 (a) Why it is necessary to use an external offset voltage-compensating network with practical Opamp circuits? 03  
 (b) What is an instrumentation amplifier? List applications of instrumentation amplifier. 04  
 (c) Draw the block schematic of a typical operational amplifier and briefly explain the function of each block. Also give the equivalent circuit of the Opamp. 07
- OR**
- (c) Derive the expression for the close loop gain, input resistance and output resistance of voltage shunt feedback amplifier. 07
- Q.3 (a) What are the advantages of active filters over passive filters? 03  
 (b) What is crossover distortion? 04  
 (c) Explain the working of class B push pull amplifier with circuit diagram. 07
- OR**
- Q.3 (a) What is Butterworth response? 03  
 (b) Explain VCO with two applications. 04  
 (c) Explain the working of summing and averaging amplifier when connected in inverting mode. 07
- Q.4 (a) List the important characteristics of the comparator. 03  
 (b) For a first order Butterworth high-pass filter, calculate low cutoff frequencies  $f_L$  and  $\omega_L$  if the component values are:  $R=22K\Omega$  and  $C=0.01\mu F$ . 04  
 (c) Explain in detail free running multivibrator using IC 555. 07
- OR**
- Q.4 (a) List important features of the 555 timer. 03  
 (b) Draw & explain working of Opamp base Wein-Bridge oscillator. 04  
 (c) Describe the working of an integrator circuit with diagram. 07
- Q.5 (a) Draw a neat diagram of window detector. 03  
 (b) What are the merits and demerits of hybrid parameters? 04  
 (c) Draw and explain basic block schematic of 79XX series three terminal voltage regulator ICs. 07
- OR**
- Q.5 (a) Draw the hybrid mode for CE and CB configuration. 03  
 (b) Explain the ideal voltage transfer characteristics of Opamp. 04  
 (c) Draw and explain the block diagram of PLL system. 07