

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-IV (NEW) EXAMINATION – WINTER 2020****Subject Code:3141002****Date:09/02/2021****Subject Name:Analog Circuit Design****Time:02:30 PM TO 04:30 PM****Total Marks:56****Instructions:**

1. Attempt any **FOUR** questions out of **EIGHT** questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain Barkhausen criterion for oscillation. **03**  
(b) Explain internal block diagram of OP-AMP **04**  
(c) Explain the basic differentiator using an op-amp. What are the problems associated with this configuration? How they are overcome? **07**
- Q.2** (a) Explain operation of PLL with basic blocks and mention any four applications of it in radio communication. **03**  
(b) Explain the working of a Square wave generator using op-amp **04**  
(c) Explain working of 555 timer based A-stable multivibrator. **07**
- Q.3** (a) Explain the concept of V to I converter with floating load. **03**  
(b) Explain inverting and non inverting amplifier using op-amp **04**  
(c) Analyze second order butterworth low Pass filter. Draw its frequency response and state design procedure. **07**
- Q.4** (a) Explain the concept of virtual ground in op-amp. **03**  
(b) Explain absolute wave circuit. **04**  
(c) What is need of clipper circuit? Explain op-amp as a positive and negative clipper along with necessary waveforms. **07**
- Q.5** (a) What is Voltage limiter circuit? **03**  
(b) Explain summing, scaling and averaging amplifier. **04**  
(c) Draw op-amp based wein bridge oscillator. Obtain frequency of oscillation and discuss amplitude stabilization for same. **07**
- Q.6** (a) Explain peak detector circuit **03**  
(b) Explain differential amplifier using two op-amps **04**  
(c) Draw the hybrid II common emitter transistor model. Also derive the expression for transistor trans-conductance. **07**
- Q.7** (a) Discuss fixed and adjustable voltage regulator with necessary circuit diagrams. **03**  
(b) Explain the magnitude and phase response of low pass function of biquad circuit. **04**  
(c) Derive the high frequency trans conductance equation for  $g_m$  for CE amplifier. **07**
- Q.8** (a) State the relation between hybrid-II and h-parameters. **03**  
(b) Design RC phase oscillator for the frequency of 2 KHz. **04**  
(c) Derive high frequency current gain for CE amplifier with  $R_S$ . **07**

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