Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV • EXAMINATION – WINTER 2013

Subject Code: 141101 **Date: 23-12-2013**

Subject Name: Advance Electronics

Time: 02:30 pm to 05:00 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	**(a)**	Draw the hybrid-π model for a transistor in CE configurations and explain it. Derive the equation for transconductance g_m.	**07**
	(b)	Classify the amplifiers based on position of operation point and also explain the distortion in amplifier.	**07**
Q.2	**(a)**	Describe the working of Emitter coupled differential amplifier.	**07**
	(b)	Explain working of Hartley oscillator. Derive the expression for frequency of oscillation.	**07**
		OR	
	(b)	Explain crystal controlled oscillator with neat sketch. Sketch the reactance vs. frequency function. Over what portion of the reactance curve do we desire oscillations to take place when the crystal is used as a part of a sinusoidal oscillator?	**07**
Q.3	**(a)**	Three identical cascaded stages have an overall upper 3-dB frequency of 20 kHz and a lower 3-dB frequency of 20 Hz. What are f_L and f_H of each stge? Also calculate bandwidth of each stage. Assume noninteracting stages.	**07**
	(b)	List the steps required to carry out the analysis of a feedback amplifier. Find A_f for an emitter follower using the feedback method of analysis	**07**
		OR	
Q.3	**(a)**	Draw and explain RC coupled amplifier. Show the low frequency model for one stage. What is the expression for f_L?	**07**
	(b)	A current series amplifier has an overall transcounductance gain of -1mA/V, a voltage gain of -4, and a desensitivity of 50. If R_s = 1K, h_{fe} = 150, and $r_{bb'}$ is negligible, find R_e, R_L and R_{if}.	**07**
Q.4	**(a)**	List the characteristics of ideal OP-AMP. Derive the expression of voltage gain for inverting and non inverting mode of OP-AMP.	**07**
	(b)	Define negative feedback. List five characteristics of an amplifier which are modified by negative feedback. Discuss any two characteristics in detail.	**07**
		OR	
Q.4	**(a)**	Show the circuit and explain how to measure Input Bias Current and CMRR of an OP-AMP.	**07**
	(b)	Draw the circuit and explain the operation of transistorized Wien Bridge Oscillator.	**07**
Q.5	**(a)**	Draw two input DTL NOR gate. Explain its working and list its advantages.	**07**
	(b)	Describe the operation of R-2R ladder DAC. How many bits are required to build R-2R DAC if reference voltage is 5V and DAC has resolution of 1 mV.	**07**
		OR	
Q.5	**(a)**	Describe the operation of successive approximation ADC with neat sketch.	**07**
	(b)	Give the comparison between various logic families.	**07**

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