Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-IV Examination-Nov/Dec-2011

Subject code: 141101 **Date: 28/11/2011**

Subject Name: Advance Electronics

Time: 02.30 pm -5.00 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		Answer The following	**14**
	(a)	What are the characteristics of an ideal op-amp? Draw its equivalent circuit along with voltage transfer curve.	**05**
	(b)	Define the following electrical parameters related to an Op-Amp. (i) CMRR (ii) Slew Rate (iii)PSRR	**06**
	(c)	Calculate A_{vf}, R_{of} and R_{if} for an amplifier with voltage series feedback. Assume R_s=0, h_{fe}=50, h_{ie}=1.1K, h_{re}=h_{oe}=0, R_e=4.7K.	**03**
Q.2	**(a)**	Derive the expression for the frequency of oscillation and the minimum gain required for sustained oscillations of the RC phase shift oscillator.	**07**
	(b)	Draw the hybrid-π model for a transistor in CE configuration and discuss it.	**07**
		OR	
	(b)	Prove that the voltage gain of the complete cascade amplifier is equal to the product of the individual stages.	**07**
Q.3	**(a)**	Describe the operation of R,2R DAC with neat sketch.	**05**
	(b)	Using miller's theorem what is the midband input capacitance for CE stage with a resistive load R_L?What is the high 3-dB frequency f_H for current gain,if we assume output time constant is small compared with the input time constant?	**05**
	(c)	State Nyquist criterion for stability .	**04**
		OR	
Q.3	**(a)**	Describe the operation of successive approximation ADC with neat sketch.	**05**
	(b)	A current series feedback amplifier has an overall transconductance of -1mA/v, a voltage gain of -4 and a desensitivity of 50. If R_s=1k, h_{fe}=150, $r_{bb'}$ is negligible. Find R_s, R_L, R_{if}, the quiescent collector current I_c at room temperature.	**05**
	(c)	State the condition on 1+Aβ which a feedback amplifier must satisfy in order to be stable.	**04**
Q.4	**(a)**	Explain Wien bride oscillator with neat sketch.What determines the frequency of oscillation?Will oscillations take place if the bridge is balanced?	**05**

	(b)	A certain amplifier has open loop voltage gain Av $=10^3$. Due to parameter variations, this gain varies with a limit of ±150. It is necessary to maintain the overall voltage gain of the amplifier within ±0.1% by using negative feedback. Find the reverse transmission feedback factor β of the feedback network. Derive the expression you use.Also find the overall gain with feedback.	**05**
	(c)	Compare TTL and ECL IC logic families.	**04**
		OR	
Q.4	**(a)**	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 part of a sinusoidal oscillator?	**05**
	(b)	Design a colpitt's oscillator to get the frequency of 100 kHz with an active device BJT having h_{fe}=50,β=50,Vcc=10V.Assuming V_E=3V,V_{CEQ}=3V,I_{CQ}=1 mA.	**05**
	(c)	Compare MOS and CMOS IC logic families.	**04**
Q.5	**(a)**	Derive The expression for current gain with resistive load using hybrid π model.	**07**
	(b)	Write short note on: comparison of ADC.	**07**
		OR	
Q.5	**(a)**	Derive the equations for the unity gain frequency and its relationship with cutoff frequencies for CE hybrid π model.	**07**
	(b)	Write short note on: Measurement of OP-AMP Parameters.	**07**

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