Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–III • EXAMINATION – WINTER • 2014

Subject Code: X31101 **Date: 24-12-2014**

Subject Name: Advance Electronics

Time: 10:30 am - 01:30 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 and explain the circuit for dual input balanced output differential amplifier circuit. Derive formula of differential gain A_d in terms of h-parameters.	**07**
	(b)	Explain the operation of a 4 bit R-2R type DAC and derive the expression for the output voltage. Find the output voltage and resolution if the digital input is 1101. Assume V_R= 10 V and R= R_f= 10kΩ.	**07**
Q.2	**(a)**	Classify the amplifiers based on position of operating point and also explain the distortion in amplifiers.	**07**
	(b)	Draw the small signal high-frequency CE model of a transistor. Derive the formula for Input conductance $g_{b'e}$ and the base spreading resistor $r_{bb'}$.	**07**
		OR	
	(b)	Write short note on: Validity of Hybrid-π model.	**07**
Q.3	**(a)**	(a) Sketch the response of an amplifier to a low-frequency square wave. (b) Define rise time. How is the rise time related to the high 3-dB frequency f_H. (c) Define tilt. How is the tilt related to the low 3-dB frequency f_L.	**07**
	(b)	What is the negative feedback system? List the general characteristics of the negative feedback amplifier and explain any two of them with necessary equation.	**07**
		OR	
	(a)	Draw and explain RC coupled amplifier. Explain effect of emitter bypass capacitor on low frequency response of RC coupled amplifier.	**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**
Q.4	**(a)**	Describe the operation of successive approximation ADC with neat sketch.	**07**
	(b)	Describe the principle of crystal oscillator along with its equivalent circuit.	**07**
		OR	
Q.4	**(a)**	Explain working of dual slope ADC with neat sketch. List its advantages and disadvantage.	**07**
	(b)	Explain Wien bride oscillator with neat sketch. What determines the frequency of oscillation?	**07**
Q.5	**(a)**	Draw block diagram of an op-amp and briefly explain each block. List characteristics of an ideal op-amp.	**07**
	(b)	Draw two input TTL NAND gate with totem-pole output. Explain its working.	**07**
		OR	
Q.5	**(a)**	Define slew rate and CMRR of an OP-AMP. Show the circuit and explain how to measure slew rate and CMRR of an OP-AMP.	**07**
	(b)	Draw NOR gate circuit using RTL logic. Explain its operation and list disadvantages.	**07**

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