Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (New) EXAMINATION – WINTER 2015

Subject Code:2130902 **Date:21/12/2015**

Subject Name: Analog Electronics

Time: 2:30pm to 5:00pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4.

			MARKS
Q.1		**Short Questions**	**14**
	1	What is the function of silicon dioxide layer in MOSFETS?	
	2	A JFET is _____ (a) current controlled device (b) Voltage controlled device (c) has high gate current (d) none of above	
	3	An enhancement mode MOSFET is off when the gate voltage is _____ (a) zero (b) less than threshold value (c) negative (d) none of above	
	4	Calculate the output voltage of a non inverting amplifier for values of $V_1 = 2V$, $R_f = 500\ K\Omega$, $R_1 = 100\ K\Omega$	
	5	Integrator is basically _____filter. (a) Low Pass (b) High Pass (c) Band Pass (d) Band Reject	
	6	Which multivibrator is basically a flip flop?	
	7	IC 555 needs to be operated in _____mode for timer operation.	
	8	For input of a square wave to a differentiator, its output will be _____ (a) sine wave (b) triangular wave (c) spikes	
	9	Write the main advantage of precision rectifier compared to diode rectifier.	
	10	Why is the speed of response of schmitt trigger is higher than conventional comparator?	
	11	The phase shift between input and output of a voltage follower is_____	
	12	IC 741 has a Unity Gain Bandwidth at gain _____ and frequency _____	
	13	_____is the fixed negative voltage regulator in series. (a) 79XX (b) 78XX (C) LM337 (d) LM 317.	
	14	What are the Barkhausen condition for oscillations to occur?	
Q.2	**(a)**	Explain the following terms. (1) PSRR (2) Input bias current (3) Input offset Voltage	**03**
	(b)	Determine the output voltage of an op-amp for input voltages of V_{i1} = 150 µV, V_{i2} = 140 µV. The amplifier has a differential gain of A_d 4000 and the value of CMRR is: (a) 100. (b) 10^5 .	**04**
	(c)	Mention the biasing circuit used for the depletion MOSFET.	**07**
		OR	
	(c)	What will be effect of voltage series feedback amplifier on input resistance, gain and stability?	**07**
Q.3	**(a)**	Explain how an OP-AMP works as an averaging amplifier?	**03**
	(b)	Explain the effect of negative feedback on frequency response in an	**04**

		OP-AMP.	
	(c)	What do you mean by slew rate in an OP-AMP? Also mention about causes of slew rate and explain its significance in applications.	**07**
		OR	
Q.3	**(a)**	Draw and explain OP-AMP as a zero crossing detector. Give suitable example of its practical application.	**03**
	(b)	What are the requirements of Instrumentation amplifier for practical purpose?	**04**
	(c)	Explain the working of a practical integrator circuit with neat sketch. Also draw output waveforms for sinusoidal and square wave inputs.	**07**
Q.4	**(a)**	Describe how an Op-amp may be used as voltage to current converter.	**03**
	(b)	State the application of OP-AMP based Wein bridge oscillator.	**04**
	(c)	Explain circuit diagram of OP- AMP as a Peak detector.	**07**
		OR	
Q.4	**(a)**	Draw the IC-555 based monostable multivibrator circuit.	**03**
	(b)	What are the applications of OP- AMP based schmitt triger circuit.	**04**
	(c)	Explain with circuit diagram the operation of a VCO.	**07**
Q.5	**(a)**	Compare between active and passive filters.	**03**
	(b)	Explain with the help of circuit diagram, the operation of second order Butterworth high pass filter.	**04**
	(c)	Design first order low pass filter for the following specifications. (1)Passband voltage gain=2 (2) Cut-off frequency fc=10 KHz..	**07**
		OR	
Q.5	**(a)**	Draw and explain typical connection diagram of LM 317 IC.	**03**
	(b)	Explain any one application of PLL	**04**
	(c)	Design IC 555 based astable multivibrator having an output frequency of 5 KHZ with 70% duty cycle.	**07**

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