Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(New) • EXAMINATION – WINTER 2016

Subject Code:2141002 **Date:18/11/2016**

Subject Name:Analog Circuit Design

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 Short Questions **14**

1 Applications of op-amp
2 Write the equation of gain with positive feedback.
3 Define slew rate.
4 List three open loop op-amp configurations.
5 The internal capacitances of a transistor are effective at _____ frequencies.
6 Which are two special cases of inverting amplifier?
7 Write the equation of CMRR in dB.
8 Name the pins of IC 555.
9 Give classification of multivibrators.
10 Applications of PLL
11 Define cut off frequency.
12 Draw frequency response of Band pass filter.
13 List three types of linear IC packages.
14 List the types of voltage regulators.

Q.2 (a) Explain Hybrid –π capacitances. **03**

(b) What is an oscillator? Explain Bark hausen criterion for oscillator. **04**

(c) Draw Hybrid –π equivalent circuit for CE transistor. Also derive the equation of input conductance $g_{b'e}$. **07**

OR

(c) Explain the working of Hartely oscillator. **07**

Q.3 (a) What is differential amplifier? **03**

(b) Define the following parameters of Op-Amp: **04**
(i) Input bias current
(ii) common mode gain
(iii) Input offset voltage
(iv) Output offset voltage

(c) What is op-amp. List out characteristics of ideal op-amp. **07**

OR

(a) Draw and explain block diagram of op-amp. **03**

(b) Derive the equation of voltage gain for inverting and non inverting configuration. **04**

	(c)	Explain all three open loop op-amp configurations.	**07**
Q.4	**(a)**	Draw block diagram of SMPS.	**03**
	(b)	Explain zero crossing detector with ckt diagram and waveforms.	**04**
	(c)	Explain application of op-amp(inverting) as summing, scaling and averaging amplifier.	**07**
		OR	
	(a)	How op-amp can be used as an integrator?	**03**
	(b)	Explain instrumentation amplifier in brief.	**04**
	(c)	Explain working of 555 timer based monostable multivibrator.	**07**
Q.5	**(a)**	What is difference between active and passive filters?	**03**
	(b)	Draw ideal characteristics of all basic filters.	**04**
	(c)	Show how Bi-quad circuit can be used as a universal filter?	**07**
		OR	
	(a)	Briefly explain Notch filter.	**03**
	(b)	Discuss magnitude scaling and frequency scaling in filter design.	**04**
	(c)	Draw sallen-key LPF and derive its transfer function.	**07**