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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2130305 **Date: 05/06/2017**

Subject Name: Analog Circuits-I

Time: 10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

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

			MARKS
Q.1		**Short Questions**	**14**
	1	Define positive feedback. elaborate its merits and demerits?	
	2	What is hall effect? State any one application.	
	3	Why it is not possible to have infinite CMRR? Justify.	
	4	Define Total output offset voltage.	
	5	What is multivibrator?	
	6	What is meant by voltage-comparator?	
	7	Draw the output waveforms of Astable multivibrator?	
	8	Draw the circuit of Schmitt trigger?	
	9	Why is the bridge not used to give phase shift?	
	10	What disadvantages does a phase shift oscillator have?	
	11	Which are two types of impurities? State their examples.	
	12	What is doping and dopant? Why doping is necessary?	
	13	Explain the formation of n type of semiconductor.	
	14	What is Unity-Gain Bandwidth?	
Q.2	**(a)**	Explain the characteristics of an Ideal Op-amp. Mention two applications of Op-Amp.	**03**
	(b)	With neat circuit diagram and waveforms, explain the working of a half wave rectifier.	**04**
	(c)	With a neat circuit diagram, explain the Voltage Divider Bias circuit using approximate analysis.	**07**
		OR	
	(c)	Give points of difference between BJT and FET. Also explain FET as voltage variable resistor.	**07**
Q.3	**(a)**	Give the difference between inverting and non-inverting Op-amp.	**03**
	(b)	Draw common emitter circuit and sketch the input and output characteristics. Also explain operating regions by indicating them on characteristics curve.	**04**
	(c)	Describe briefly the construction and working of p channel enhancement MOSFET. Draw its characteristic and transfer curve.	**07**
		OR	
Q.3	**(a)**	Write different types of P-N junctions. Explain formation of P-N junction, barrier potential in P-N junction.	**03**
	(b)	Derive the relationship between α and β. Calculate the value of I_c, I_e for a transistor that has $\alpha = 0.98$ and $I_b = 100\mu A$.	**04**

	(c)	Give constructional details of JFET and give its characteristics. Why FET is called voltage controlled device?	**07**
Q.4	**(a)**	Explain about slew rate & its effects. Derive the expression for slew rate.	**03**
	(b)	Write short note on Antilog Amplifier.	**04**
	(c)	Explain with diagrams the principle of operation & design of an Astable multivibrator using 555 timers.	**07**

OR

Q.4	**(a)**	Draw the circuit diagram of voltage follower. What are its closed loop voltage gain and bandwidth?	**03**
	(b)	What is Window Detector? What is the use of Window Detector?	**04**
	(c)	Draw & explain the circuit of a RC phase shift Oscillator. Derive an expression for its frequency of operation.	**07**
Q.5	**(a)**	Write short note on Differentiator using OP-AMP.	**03**
	(b)	Explain BJT as a switch.	**04**
	(c)	Explain instrumentation Amplifier & derive its expression for output voltage.	**07**

OR

Q.5	**(a)**	Draw the circuit diagram of differential amplifier with a gain of 10 and write the expression for the output voltage.	**03**
	(b)	Explain the effect of temperature on a p-n junction diode.	**04**
	(c)	Write Short notes on: Clipper and Clampers	**07**

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