

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-V (OLD) EXAMINATION – WINTER 2018****Subject Code:151003****Date: 27/11/2018****Subject Name: Integrated Circuits And Applications****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.

		<b>MARKS</b>
<b>Q.1</b>	(a) Explain the internal block diagram of OP-AMP in detail with the function of each block.	<b>07</b>
	(b) Which type of feedback is used in inverting op-amp? Derive exact expressions for voltage gain, input resistance, output resistance and bandwidth for inverting op-amp.	<b>07</b>
<b>Q.2</b>	(a) Explain following terms related to op-amp: 1. CMRR, 2. PSRR, 3. Slew Rate, 4. Input offset current, 5. Input offset voltage.	<b>07</b>
	(b) Explain the concept of virtual ground in OP-AMP and why open loop op-amp configurations are not used in linear application?	<b>07</b>
<b>OR</b>		
	(b) Explain application of op-amp (Inverting configuration) as summing, Scaling and averaging circuit.	<b>07</b>
<b>Q.3</b>	(a) Draw and derivation the output voltage in term of input voltage of basic integrator using an op-amp. What are the Problems associated with this configuration? How they are overcome?	<b>07</b>
	(b) Explain Schmitt trigger circuit along with circuit diagram and necessary waveforms. State its advantages and applications.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) Explain triangular wave generator circuit.	<b>07</b>
	(b) Analyze second order butterworth High Pass filter. Draw its frequency response and state design procedure.	<b>07</b>
<b>Q.4</b>	(a) Draw and explain Monostable multivibrator using 555 timer IC.	<b>07</b>
	(b) Draw the circuit diagram of monostable multivibrator using IC 555. Calculate the component values if the controlled door should remain open for 15 secs after a trigger signal is received. The DC voltage available is 10V.	<b>07</b>
<b>OR</b>		
<b>Q.4</b>	(a) Explain operation of Astable multivibrator using IC 555.	<b>07</b>
	(b) Design an astable multivibrator for an output frequency of 5 KHz and duty cycle 40%. Consider $C=0.047 \mu\text{F}$ .	<b>07</b>
<b>Q.5</b>	(a) What are the different types of voltage regulators? Discuss LM317 based adjustable voltage regulator. Indicate bypass capacitors to improve transient response and protective diodes in the connection diagram.	<b>07</b>
	(b) State the applications of operational transconductance amplifier and explain any one with necessary circuit and derivation	<b>07</b>

**OR**

- Q.5** (a) Draw block diagram of basic PLL and explain operation of each of the blocks. **07**
- (b) What do you understand by precision rectifier circuit? Illustrate op-amp based full-wave rectifier circuit with its complete functionality. **07**

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