

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE – SEMESTER – VI (OLD).EXAMINATION – WINTER 2016**

**Subject Code: 160801****Date: 26/10/2016****Subject Name: Integrated Circuits & Application****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.

- Q.1 (a)** What are the characteristics of an ideal op-amp? Draw its equivalent Circuit along with voltage transfer curve. **07**
- (b)** Define following terms: **07**
- I. Input offset voltage
  - II. Input offset current
  - III. Input Bias Current
  - IV. Common mode Rejection Ratio
  - V. Supply Voltage Rejection Ratio
  - VI. Transient Response
  - VII. Slew Rate
- Q.2 (a)** Draw a functional block diagram representation of a typical Op-Amp. Explain it in detail. **07**
- (b)** What are the two differential amplifier configurations? Briefly compare and contrast these configurations. **07**
- OR**
- (b)** The 714C op-Amp having the following parameter is connected as a non-inverting amplifier with  $R_1=470 \Omega$  and  $R_f = 4.7 \text{ k} \Omega$ : **07**
- $A = 400000$   
 $R_i=33 \text{ M} \Omega$   
 $R_o = 60 \Omega$   
 Unity gain bandwidth = 0.6MHz  
 Supply voltage =  $\pm 15\text{v}$   
 Output voltage swing =  $\pm 13\text{v}$   
 Compute the value of  $A_F$ ,  $R_{iF}$ ,  $R_{oF}$ ,  $f_F$ , and  $V_{oot}$ .
- Q.3 (a)** What is error voltage? How can it be reduced? Explain it with required formula. **07**
- (b)** Explain a monostable multivibrator using IC 555, also derive necessary equation for that. **07**
- OR**
- Q.3 (a)** Explain peaking amplifier with required diagram and equation. **07**
- (b)** Explain summing, Scaling and averaging amplifier for inverting Configuration with required diagram and equation. **07**
- Q.4 (a)** Explain the instrumentation amplifier and give brief note on transducer bridge. **07**
- (b)** Explain sample and hold circuit with required diagram and equation. **07**

**OR**

- Q.4 (a)** Draw and explain a circuit diagram using op-amp which can produce 5KHz square output waveform at its output side. **07**
- (b)** Explain peak detector circuit concept using op-amp with required diagram and equation. **07**
- Q.5 (a)** Explain the operation of Phase Locked Loop with its block diagram. **07**
- (b)** What is a comparator? Explain zero crossing detector circuit with required diagram and waveform. **07**
- OR**
- Q.5 (a)** How to generate a triangle wave using op-amp? Draw a circuit diagram and explain it with necessary equation. **07**
- (b)** Explain Schmitt trigger with required diagram and equation. **07**

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