

GUJARAT TECHNOLOGICAL UNIVERSITYPDDC - IVth Semester–Examination – May- 2012**Subject code: X41103****Subject Name: Integrated Circuits and Application****Date: 10/05/2012****Time: 02:30 pm – 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** (a) Derive the expression for voltage gain, input resistance, output resistance and bandwidth of inverting amplifier using Op-amp with negative voltage shunt feedback **07**
- (b) (i) Explain the Characteristics of Ideal Op-amp (04) **07**
(ii) Draw Equivalent Circuit diagram of an Op-amp and its Ideal voltage transfer curve (03)
- Q.2** (a) Explain application of Op-amp (Inverting Configuration) as Summing, Scaling and averaging circuit **07**
- (b) Define following terms 1.CMRR 2.PSRR 3.Slew Rate **07**
4.Input Offset voltage 5.Input Offset current 6.Input bias current 7.Equivalent input noise voltage and current
- OR**
- (b) Explain various types of Open loop Op-amp configuration **07**
- Q.3** (a) Draw and explain positive and negative clamper circuits by Op-amp. **07**
- (b) Draw and explain working Op-amp based half wave rectifier circuit. How is it better in performance compared to half wave rectifier circuit without Op-amp? **07**
- OR**
- Q.3** (a) Draw and explain voltage limiters circuits by Op-amp. **07**
- (b) Draw and Explain circuit diagram of Op-amp based antilog amplifier **07**
- Q.4** (a) Explain working of 555 based monostable multivibrator. **07**
- (b) What are Different types of Voltage regulator? Discuss LM317 based adjustable voltage regulator **07**
- OR**
- Q.4** (a) Draw and Explain circuit diagram of 555 based free running ramp generator. **07**
- (b) Draw Block diagram of phase-locked loop and explain it. **07**
- Q.5** (a) Draw Op-amp based Differentiator circuit and derive expression for its output voltage in terms of its input voltage. **07**
- (b) Draw Circuit diagram of Op-amp based first order high pass Butterworth filter and explain it **07**
- OR**
- Q.5** (a) If V_1 , V_2 , V_3 and V_4 are four input voltages and V_o is output voltage then design circuit diagram by using Op-amp that gives output voltage $V_o = V_1 + V_2 - V_3 - V_4$. **07**
- (b) Draw Circuit diagram of Op-amp based second order low pass Butterworth filter and explain it **07**
