

GUJARAT TECHNOLOGICAL UNIVERSITY**PDDC - SEMESTER-IV • EXAMINATION – SUMMER • 2014****Subject Code: X41103****Date: 21-06-2014****Subject Name: Integrated Circuits and Applications****Time: 10:30 am - 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)** Derive the equations of closed loop voltage gain, input resistance and output resistance with feedback for voltage series negative feedback amplifier. **07**
- (b)** Explain Biquad filter design in detail. **07**
- Q.2 (a)** The 741C op-amp having the following parameters is connected as a non-inverting amplifier with $R_1 = 2.7k\Omega$ and $R_F = 15k\Omega$: $A = 200000$, $R_i = 2M\Omega$, $R_o = 75\Omega$, $f_o = 5Hz$, supply voltage = $\pm 15V$, output voltage swing = $\pm 13V$. Compute the values of A_F , R_F , R_{OF} , f_F , and V_{OOT} . **07**
- (b)** Explain RC-CR transformation in detail. **07**
- OR**
- (b)** Design a bandpass filter with a center frequency at $\omega_o = 1000$ rad/sec, a bandwidth of 200 rad/sec, and a maximum gain of 1, using the biquad circuit. **07**
- Q.3 (a)** Explain differential amplifier with two op-amps in detail. **07**
- (b)** Explain summing, scaling and averaging amplifier using op-amp inverting configuration in detail. **07**
- OR**
- Q.3 (a)** Explain DIDO amplifier in detail. **07**
- (b)** Explain voltage-to-current converter with grounded load in detail. **07**
- Q.4 (a)** Explain differentiator using op-amp in detail. **07**
- (b)** Explain square wave generator using op-amp in detail. **07**
- OR**
- Q.4 (a)** Explain Schmitt trigger circuit using op-amp in detail. **07**
- (b)** Explain Monostable Multivibrator using 555 timer in detail. **07**
- Q.5 (a)** Explain operating principles and phase detector of phase-locked loop in detail. **07**
- (b)** Explain adjustable voltage regulators in detail. **07**
- OR**
- Q.5 (a)** Explain fixed voltage regulators in detail. **07**
- (b)** Explain astable multivibrator using 555 timer in detail. **07**
