

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV • EXAMINATION – SUMMER • 2014****Subject Code: 141101****Date: 20-06-2014****Subject Name: Advance Electronics****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 expression for the CE short-circuit current gain A_i as a function of frequency. **07**
- (b) The bandwidth of an amplifier extends from 20 Hz to 20 kHz. Find the frequency range over which the voltage gain is down less than 1 dB from its mid-band value. **07**
- Q.2** (a) Define negative feedback and positive feedback. Derive relationship between A_f and A . **07**
- (b) List the procedures to follow to obtain the basic amplifier configuration without feedback but taking the loading of the β network into account. **07**
- OR**
- (b) Draw the circuit of a voltage-shunt feedback amplifier. **07**
- Q.3** (a) State and explain the Nyquist criterion for stability. **07**
- (b) An RC coupled amplifier with a midband voltage gain of 1000 is converted into a feedback amplifier by feeding 10 percent of its output voltage in series with the input opposing. What is the ratio of the half power frequencies with feedback to those without feedback? If f_L and f_H for the amplifier without feedback are 20 Hz and 50 kHz respectively, what are the corresponding values after feedback has been added? **07**
- OR**
- Q.3** (a) Sketch the circuit of a crystal controlled oscillator. **07**
- (b) A crystal has the following parameters : $L=0.33$ H, $C=0.065$ pf, $C'=1.0$ pF and $R=5.5$ K. Find the series resonant frequency. By what percent does the parallel resonant frequency exceed the series resonant frequency? Find the Q of the crystal. **07**
- Q.4** (a) Draw an IC OP Amp in block diagram form. Identify each stage by function. **07**
- (b) Draw the equivalent circuit from which to calculate A_c for the emitter coupled differential amplifier. Repeat the procedure for A_d . **07**
- OR**
- Q.4** (a) Sketch the transfer characteristics of a differential amplifier. Explain why AGC is possible with the differential amplifier. **07**
- (b) Give DC analysis of output stage of MC 1530. Assume suitable component values and supply voltages. **07**
- Q.5** (a) Draw the circuit of TTL gate and explain its operation. **07**
- (b) Explain working of counter type ADC with suitable numerical example. **07**
- OR**
- Q.5** (a) Explain weighted resistor DAC. **07**
- (b) Explain working of successive approximation ADC with suitable numerical example. **07**
