5. Answer any **two** parts of the following : **(10×2=20)**

(a) Explain the basic principles of a PLL with suitable block diagram and mention its applications in detail.

(b) List the characteristics of an Operational Transconductance Amplifier (OTA). Draw the inverting and non-inverting amplifier using OTA.

(c) Write short notes on the following :

(i) Log and Antilog amplifiers

(ii) Analog Multipliers.

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2115 **Roll No.**

B.Tech.

(SEM. V) ODD SEMESTER THEORY EXAMINATION 2013-14

ANALOG INTEGRATED ELECTRONICS

Time : 3 Hours *Total Marks : 100*

Note :– Attempt **all** questions.

1. Answer any **four** parts of the following : **(5×4=20)**

(a) Briefly explain the need for compensating networks in op-amps.

(b) Explain the effect of negative feedback on frequency response.

(c) The 741 IC is connected as a non-inverting amplifier. What maximum gain can be used that will keep the amplifiers's response flat to 10 kHz ?

(d) How does the high frequency model of an op-amp differ from the equivalent circuit of an op-amp ?

(e) Why are low closed loop gains avoided with uncompensated op-amps ? Explain.

(f) What is the frequency response ? Defin "break frequency" and "bandwidth".

2. Answer any **two** parts of the following : **(10×2=20)**

(a) Explain the working of practical Integrator. Also derive and explain its frequency response. Design a practical integrator circuit with a d.c. gain of 10, to integrate a square wave of 10 kHz.

(b) Draw and explain the commonly used three op-amp instrumentation amplifier. Derive expression for its gain. Also design the instrumentation amplifier to have a variable differential gain in the range 5-200. Use a 50 kΩ potentiometer.

(c) (i) Draw the V-I converter and derive output voltage equation for grounded load.

(ii) Explain the difference between inverting and differential summing amplifiers.

3. Answer any **four** parts of the following : **(5×4=20)**

(a) Design a low pass filter using Op-Amp at a cut-off frequency of 1 kHz with pass gain of 2. And plot the frequency response of this low pass filter.

(b) Design a multiple feedback narrow band pass filter with f_c = 1 kHz, Q = 3 and A = 10.

(c) Draw the circuit diagram of a All Pass Filter and show that phase is given by $\Phi = -2 \tan - t\ 2\ fRC$.

(d) Design a Wide Band Pass Filter with lower cutoff frequency 200 Hz and higher cutoff frequency 1 kHz and a pass band gain = 4.

(e) Explain the operation of a 3-bit R-2R type DAC.

(f) Discuss the successive approximation type A/D converter.

4. Answer any **two** parts of the following : **(10×2=20)**

(a) Using op-amp design triangular wave generator and square wave generator.

(b) What are the advantages of the adjustable voltage regulator over the fixed voltage regulator ? Describe the working of adjustable voltage regulator.

(c) Write short notes on the following :

(i) Precision rectifiers

(ii) Schmitt trigger.