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

PAPER ID : 3000 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. V) ODD SEMESTER EXAMINATION 2010-11

ANALOG INTEGRATED ELECTRONICS

Time : 3 Hours *Total Marks : 100*

Note :– 1. Attempt **all** questions.
2. All questions carry equal marks.

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

(a) Explain briefly the need of compensating networks in op-amps.

(b) The op-amp 709 is used as a non-inverting amplifier with a gain of 50 dB. What is the bandwidth if C_1=500 pf, R_1=1.5 k Ω, C_2 = 20 pf.

(c) Draw the high frequency equivalent circuit of an op-amp and explain in detail.

(d) What is the bandwidth of a unity gain amplifier made up of op-amp 709C ?

(e) Describe frequency response plot and Bode plot used to measure frequency response of an op-amp.

(f) The 741C is connected as a inverting amplifier with a closed loop gain of 20. What is its band width ? Is the circuit stable ? Comment.

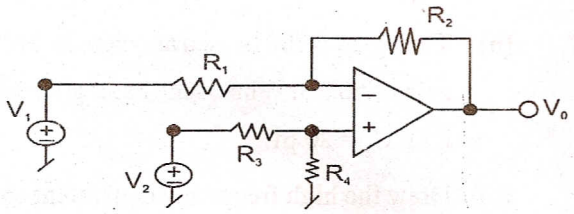
Attempt any **two** parts of the following : **(10×2=20)**

(a) (i) Using an op-amp powered from ±15 V regulated supplies, design a photo detector amplifier such that as i_1 (input current) changes from 0 to 1 μA. V_0 changes from –5V to + 5V.

(ii) What is the minimum loop gain for a deviation of the transfer characteristic from the ideal of less than 1% ?

(b) (i) For the following circuit if $R_1 = R_3 = 10K$, assuming perfectly matched resistors find V_0 for each of the following input voltage pairs (V_1, V_2)=-(0.1V, +0.1V) (4.9V, 5.1V).

(ii) With mismatched resistor values R_1=10K, R_2=98K, R_3=9.9K and R_4=103K find V_0 for each of the following input voltage pairs (V_1, V_2)=-(0.1V,+0.1V) (4.9V, 5.1V).



(c) Describe the working of an instrumentation amplifier with a neat circuit diagram.

Attempt any **four** parts of the following : **(5×4=20)**

(a) Using the frequency scaling technique convert the 1 kHz cutoff frequency of the low pass filter with a pass band gain of 2 to a cutoff frequency of 1.6 kHz.

(b) Design a wide band pass filter with f_l=200Hz and f_h = 1kHz and a pass band gain = 4.

(c) Design a high pass filter at a cutoff frequency of 1kHz with a pass gain of 2.

(d) Describe point-wise the design procedure of frequency to voltage converter.

(e) With a neat sketch of the block diagram of successive approximation type Analog to Digital converter, describe the working principles.

(f) Define the following terms for Digital to Analog converters : (i) Resolution, (ii) Settling time and (iii) Conversion time.

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

(a) Draw the circuit of high speed sample and hold circuit and sketch the input signal, control and output waveforms. Also describe its working.

(b) Describe the working of a full wave precision rectifier with a neat sketch.

(c) Realise a peak detector using a precision rectifier circuit. Describe its working.

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

(a) Explain the working of Antilog amplifier with neat sketch and find the expression of the output of the antilog amplifier. Also enlist the application of this circuit and explain in detail one of them.

(b) Write a note on Operational Transconductance Amplifier.

(c) Write a note on Noise in Integrated Circuits.