(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 2010-11

ANALOG INTEGRATED ELECTRONICS

Time : 3 Hours   *Total Marks : 100*

Note : Attempt **all** questions.

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

   (a) Draw the high frequency model of an Op-Amp with double break frequency. Explain the principle of this circuit.

   (b) Explain dc and ac amplifier.

   (c) The parameters for the differential Amplifier are given as $R_C = 1$ K-ohm, $R_S = 1$ K-ohm, $h_{fe} = 1$ K ohm and $R_e = 2$ M ohm. Neglecting hoe, calculate the difference mode gain and common mode gain. Hence calculate CMRR in dB. The amplifier is in dual input balanced output configuration.

   (d) What do you mean by differential amplifier ? Explain the operation of a basic differential amplifier. Give the four differential amplifier configurations.

(e) Show that $V_0 = R_2/R_1 (V_1 - V_2)$ where $V0 = V_4 - V_3$ for a differential amplifier with double ended output whose circuit is given below :
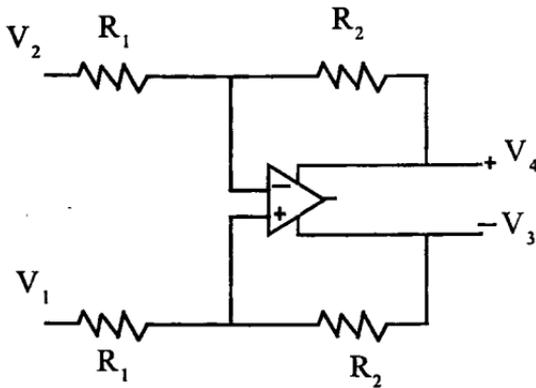
(f) What would be the maximum Frequency of the input Voltage connected to an Op-Amp having maximum slew rate of 1/mus if the magnitude of the input voltage is 1 V.

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

(a) Draw and explain the commonly used three Op-Amp instrumentation amplifier ckt. Derive expressions for its gain.

(b) Explain the working of Practical differentiator. Also derives its frequency response.

(c) Design the instrumentation amplifier to have a variable differential gain in the range 5-200. Use a 50 Kohm potentiometer.

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

    (a) What are the advantages of active filter over passive filter ?

    (b) Explain the working of a voltage to frequency converter with neat sketch.

    (c) Define in case of ADC :

        (i) Resolution

        (ii) Quantization error

        (iii) Conversion time.

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

    (a) What are precision rectifiers ? Explain full wave precision rectifier with circuit diagram waveforms.

    (b) Explain the types of switching regulators and enlist their characteristics. Why do switching regulator have better efficiency than the series regulator ?

    (c) Write short notes on :

        (i) Schmitt Triggers

        (ii) Analog switches

        (iii) Analog multipliers

        (iv) Voltage comparators.

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

(a) What do you mean by antilog amplifier ? How log amplifier can be turned around to provide antilog function ? Explain.

(b) List the characteristics of an operational Trans-conductance amplifier (OTA). Draw the inverting and non-inventing amplifier using OTA.

(c) Explain the basic principles of a PLL and mention its applications. If a wave form has a positive peak of magnitude V_2, draw a circuit using two peak detectors whose output is equal to the peak to peak value V_1-V_2.