EEC509

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

PAPER ID : 2115 Roll No. | | | | | | | | | | |

**B.Tech.**

(SEM. V) THEORY EXAMINATION 2011-12

**ANALOG INTEGRATED ELECTRONICS**

*Time : 3 Hours* *Total Marks : 100*

**Note :–** (1) Attempt all questions.

(2) **All** questions carry equal marks.

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

(a) Draw the open loop frequency response of operational amplifier (Op-Amp) and explain it.

(b) Discuss in brief that how the high frequency model differs from the equivalent circuit of an Op-amp. Discuss frequency response of internally compensated Op-Amp.

(c) What is the stability of an Op-amp ? Explain the various stability specifications with constant gain bandwidth product.

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

(a) Draw and explain the Instrumentation Amplifier using Op-Amp. Discuss the most desired characteristic of it and maximum limit to that.

(b) Design an inverting Op-Amp circuit with a voltage gain of

$A_v = V_o/V_1 = -8$, when the input voltage is $V_1 = -1V$. Maximum current in $R_1$ and $R_2$ must be no longer than 15μA. Determine the minimum values of $R_1$ and $R_2$.

(c) (i) Draw the I-V converter and derive its output expression.

(ii) Draw the V-I converter and derive output voltage equation for floating load.

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

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

(b) Discuss the classification of active filters and explain its advantage and disadvantage with suitable example using Op-Amp.

(c) (i) Draw a block diagram and explain the characteristic of successive approximation type A/D converter.

(ii) For the digital input 1111 with R/2R ladder 4 bit type DAC, find the output voltage and resolution. Assume V=10V and R=10kΩ.

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

(a) Write short notes on the following :

(i) Square wave generator

(ii) Triangular wave generator.

(b) With the help of a neat block diagram, explain the principle of working of Sample and Hold circuit using Op-Amp. Enlist its applications.

(c) (i) Explain in brief the advantage of Precision rectifier over simple diode rectifier.

(ii) A Precision rectifier having the value of gain is $-2$ for the negative input and zero otherwise and input resistance is 100 KΩ as shown in given figure 1. Determine the value of $R_1$ and $R_2$.

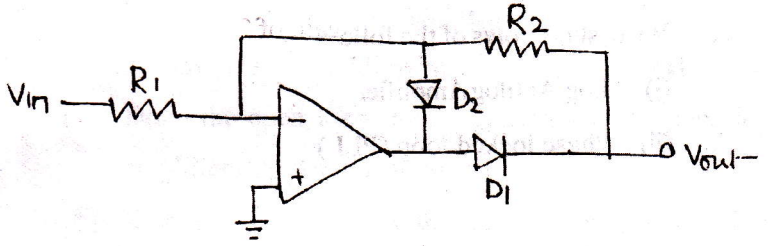


Figure 1

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

(a) Using the block diagram explain the functionality of an OTA.

(b) (i) What are the advantages of the adjustable voltage regulator over the fixed voltage regulator ?

(ii) Determine the value of R1 and R2 if the maximum allowable current through then is 100μA for Schmitt Trigger as given in figure 2. Assuming $V_{sat} = +10V$, $-V_{sat} = -10V$ and $V_H = 0.1V$.

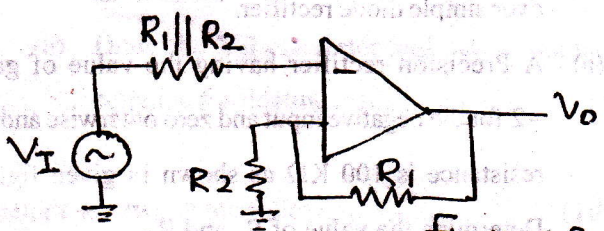

Figure 2

(c) Write short notes of the following :

(i) Log/Antilog Amplifier

(ii) Phase locked loop (PLL)