Roll No. _____ Total Pages : 3

8914

BT-5/D05

LINEAR IC APPLICATIONS

PAPER - ECE-3O7E

Time : 3 Hrs. Maximum Marks : 100

Note : Attempt any five questions. All questions carry equal marks.

1. a. Design a dual-input, balanced output differential amplifier with a constant current bias, using diodes, to satisfy the following requirements :-

   Differential gain $A_d = 40 \pm 10$

   Current supplied by constant current bias circuit = 40 mA

   Supply voltage $V_S = \pm 10V$

   Diodes are assumed to be identical and $VD_1 = VD_2 = 0.7V$ 10

   b. what is the intrnal cirucit of integrated circuit OPAMP ? Discuss in detail. Describe the level translator circuit. 10

2. a. Comment on the power supply requirements of Linear and Digital ICs. 5

   b. What is the difference between open loop and closed loop OPAMP configuration ? 5

   c. Describe the parameters that are important for ac applications. 10

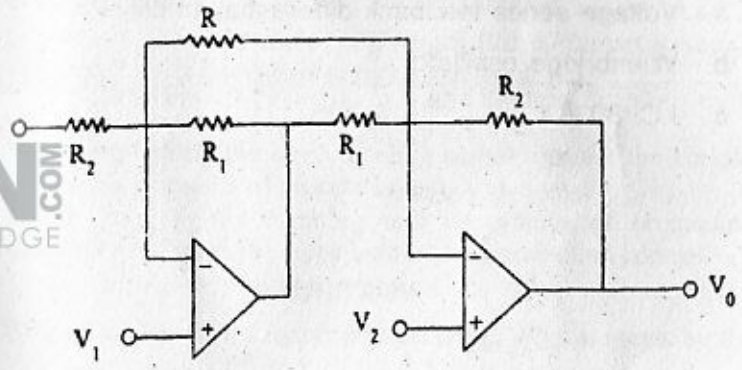
3. a. What is the usef of compensation resistor ? Why is it

not needed in differential amplifier ? Discuss. 10

b. Define slew rate. What causes the slew rate ? How is it measured ? An OPAMP has a slew rate of 2 V/μs. Find the rise time for an output voltage of 10V amplitude resulting from a rectangular pulse input if the OPAMP is slew rate limited. 10

4. a. For the instrumentation amplifier shown, verify that :

$$V_0 = 1 + \left(\frac{R_2}{R_1} + \frac{2R_2}{R}\right)(V_2 - V_1)$$



Note that gain may be adjusted by varying R. 10

b. What are the limitations of an ordinary OPAMP differentiator ? Describe the circuit of a practical differentiator that will eliminate these limitatiions. 10

5. a. How does the high frequency model differe from the equivalent circuit of an operational amplifier ? 8

   b. Derive the expression for voltage gain as a function of frequency. Define break frequency and bandwidth. 12

6. a. Discuss the application of OPAMP as :

(i) Inverting amplifier

(ii) Summing amplifier 10

b. Describe the OPAMP Clipper circuit, which will Clip the input signal below the reference voltage. 10

7. a. Describe the first order high pass Butterworth filter. 8

b. Explain how a 555 timer can be used as a frequency divider. 4

c. describe the basic building blocks of PLL. 8

8. Write short notes on the following :

a. Voltage series feedback differential amplifier

b. Wienbridge oscillator

c. I.C. 8038 7, 7, 6