

Roll No. ....

Total Pages : 3

**GSM/D-20**

**937**

**OPAMP AND LINEAR INTEGRATED  
CIRCUITS-I**

Paper - I

*Time allowed : 3 Hours*

*Maximum Marks : 40*

**Note :** Attempt **five** questions in all, selecting one question from each unit. Questions No. 1 is compulsory.

**Compulsory Question**

1. (i) What is buried layer. Why is it used ?  $2 \times 4 = 8$
- (ii) How virtual ground is different from ordinary ground ?
- (iii) State the applications of Schmitt trigger.
- (iv) Differentiate between an active and passive filter. Which is advantageous & why ?

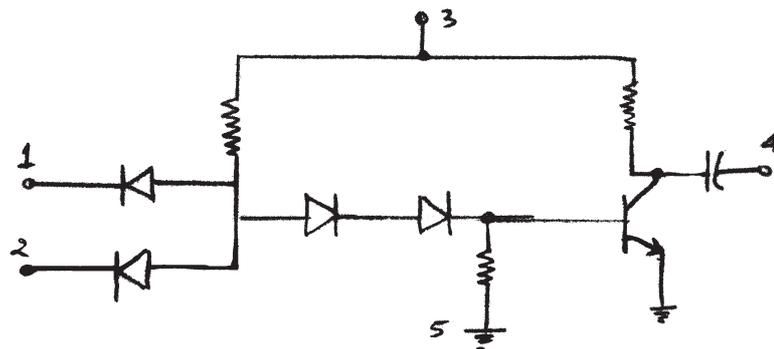
**UNIT-I**

2. (i) What is the difference between dielectric isolation and beam lead isolation ? Draw appropriate diagrams. 4

- (ii) What is a positive photoresist and how it is different from negative photoresist ? 4
3. (i) What are the advantages of an IC and what are its limitations. 3
- (ii) Describe photo-etching process. How many masks are required to complete an IC ? List the function performed by each mask. 5

### UNIT-II

4. Describe clearly the various steps involved in fabricating the following monolithic circuit : 8



5. (i) How JFET and MOSFET are fabricated using monolithic process ? 4
- (ii) Define sheet resistance  $R_s$ . What is the order of  $R_s$  for base region and also for emitter region ? Sketch the cross section of an IC resistor. 4

### UNIT-III

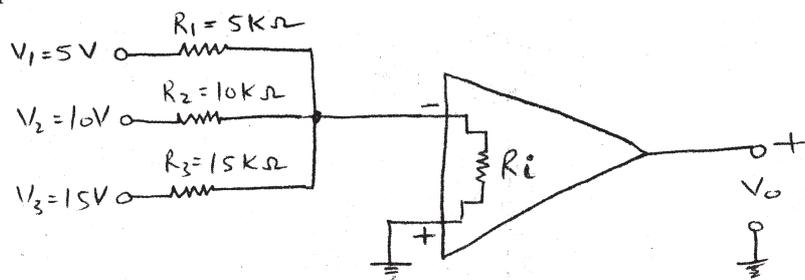
6. (i) In an OPAMP, the input and output resistances are  $300\text{k}\Omega$  and  $100\Omega$  respectively, when negative feedback is applied to increase the input resistance to  $20\text{M}\Omega$ , the gain of the amplifier reduces to 500. Find :

- (i) Open loop voltage gain
- (ii) Closed loop output resistance
- (iii) Feedback factor.

- (ii) Show that the output of an ideal differential amplifier is independent of drift.

7. (i) Explain why the CMRR is infinite if a true current source is used in a symmetrical emitter-coupled differential amplifier ?

- (ii) For the circuit show below, find the output voltage  $V_o$ , if open loop gain is  $10^3$ ,  $R_i = 50\text{K}$ .



## UNIT-IV

8. (i) Discuss Butterworth first order high pass filter. Find the expression for the magnitude of gain and the low cutoff frequency of this filter. Draw its frequency response curve too. 4
- (ii) Draw and explain the circuit of integrator. What are its disadvantages ? How can these be removed in a practical integrator circuit ? 4
9. (i) Discuss the working of OPAMP as Schmitt Trigger with its transfer characteristics. 4
- (ii) Discuss how an OPAMP can be used for multiplication and division of signals. 4