Question paper

1. In the circuit of figure 1 M2 is twice wide as M1. Calculate the small signal gain if the bias values of Vin1 and Vin2 are equal.

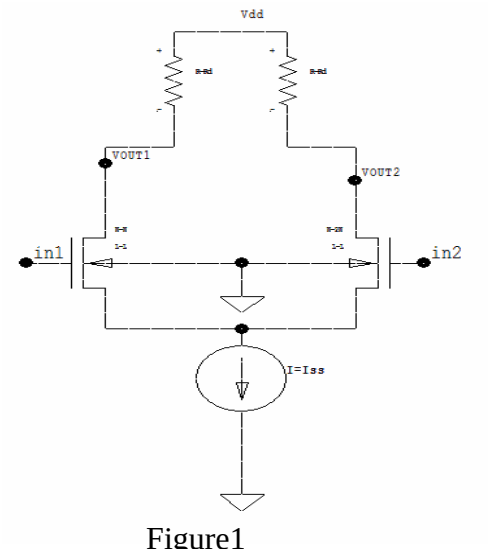

Figure1

2. Find out the values of R and C in the RC lo pass filter circuit with cut off frequency at 10MHz
3. What is the antenna effect in the layout?
4. Draw Schematic of a transistor level two input NAND gate
5. Explain the various MOSFET Capacitances & their significance
6. What happens if we increase the number of contacts or via from one metal layer to the next?
7. What are the types of noise of MOSFET, how to eliminate them?.
8. What is use of band gap voltage reference? How does a Band gap Voltage reference work?
9. What is offset voltage in opamp? How this is generated? What are the techniques to reduce offset voltage?
10. Why current mirrors are used in the circuits.

11. calculate the small signal voltage gain of circuit in figure 3

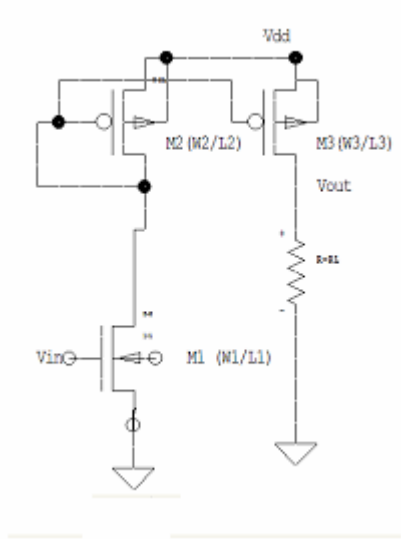

Figure3

12. The circuit in the figure 4 is designed for nominal gain of c1/c2 =8. How should c1 and c2 be laid out to ensure precise definition of gain.

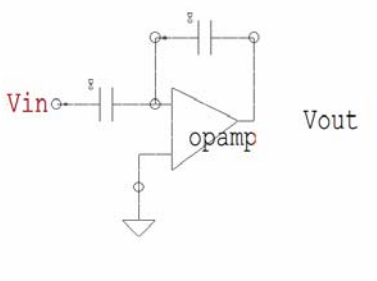

Figure4

13. Draw the schematic and layout of an inverter with pmos width 3um, length 1 um and NMOS width 1 um length 1 um.
14. Compare between Bipolar and CMOS technology at least five points.
15. For a 0.18um and 0.8um technology MOSFET, which has a higher cutoff frequency and why?