Home Work –3

Submitted By
Group3
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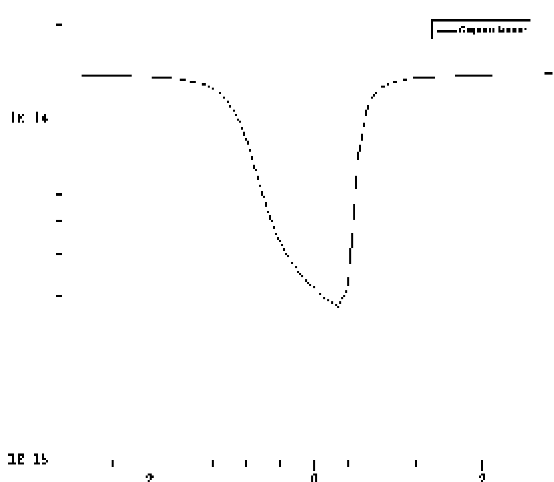
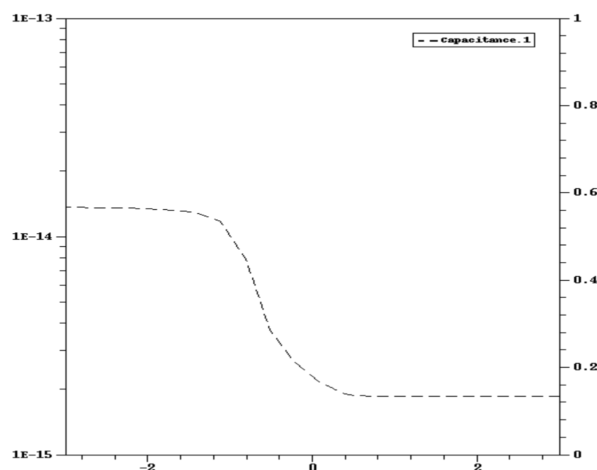
Q1a) The C-V char. Of MOS Capacitor are as shown in the following figures:



a) Low Freq.



b) High Freq.

Values obtained From INSPECT:

V_{fb}=**-1.4**v and C_{fb}=**7.63**fF.

C_{ox}=**13.34** *f*F

C_{min}=**1.83**fF(for HFCV) and **2.29**fF (for LFCV).

V_t= **0.384**v.

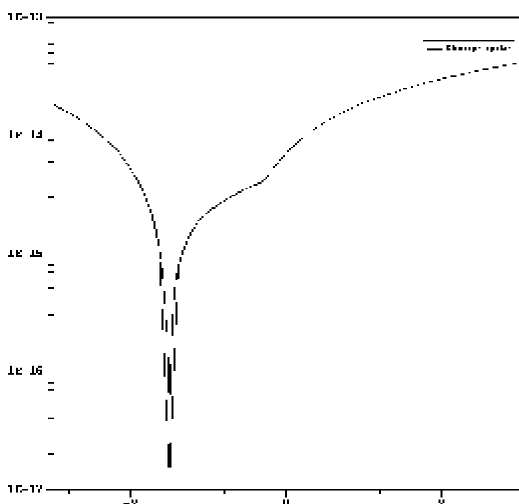
Theoretical values

V_{fb}=**-0.96**v(=ϕ_{ms}), C_{fb}=**7.79** *f*F

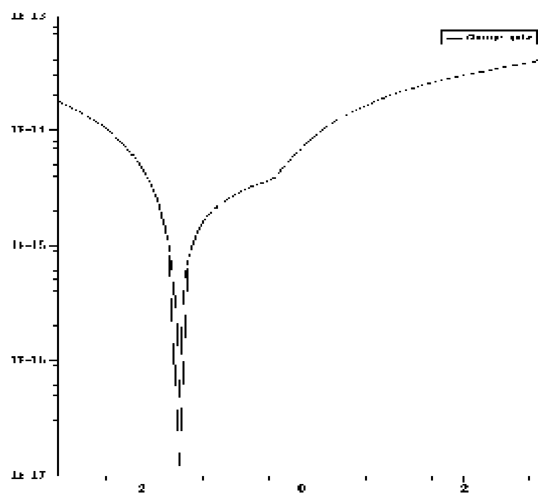
C_{min}=**2.04***f*F(=$C_{ox}*C_d/(C_{ox}+C_d)$),$C_d=\varepsilon_s/W_d$

$C_{ox}=e_{ox}*A/T_{ox}$ =***13.81 fF***

$V_t=\phi_{ms} + Q_d/C_{ox} + 2\phi_b$ =**0.214** V.



c) Low freq.



d) High freq.

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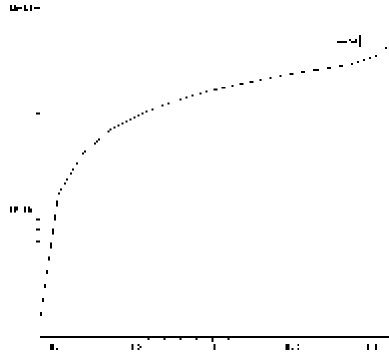
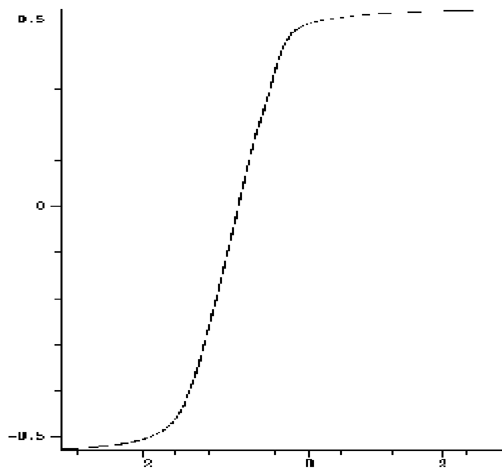
The values form simulation for Vfb are different from that of theoretical values. While making the device we used Gatepoly as poly. Material and the barrier which it has defined is –0.55 v. even if we change this barrier we get the same plot so probably an offset is added to the ϕ_{ms} value.

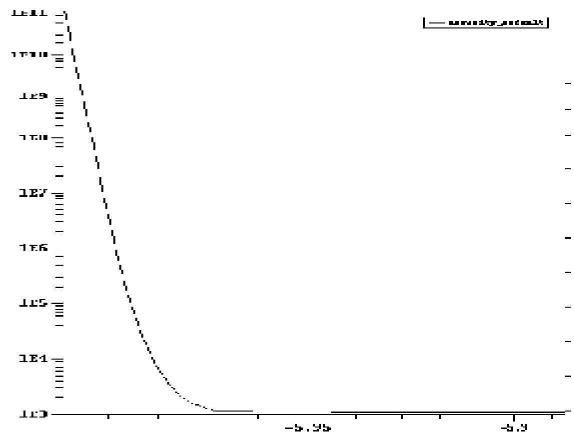


Variation o f Depletion Width in MOS as a function of surface potentialϕ_s

b) Surface potential ψ_s vs. Vg.:-the fig. Shows respective plot.

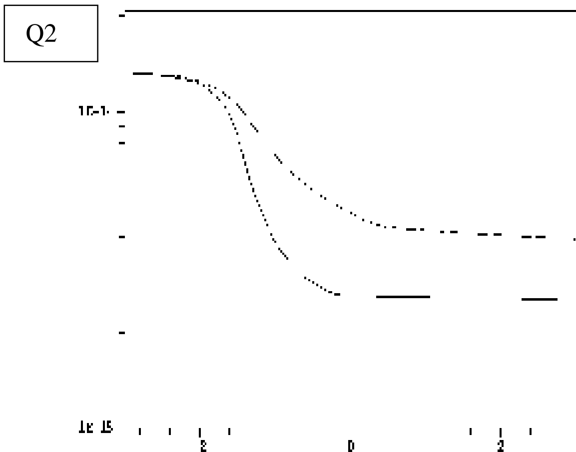


e) ψ_s vs. Vg

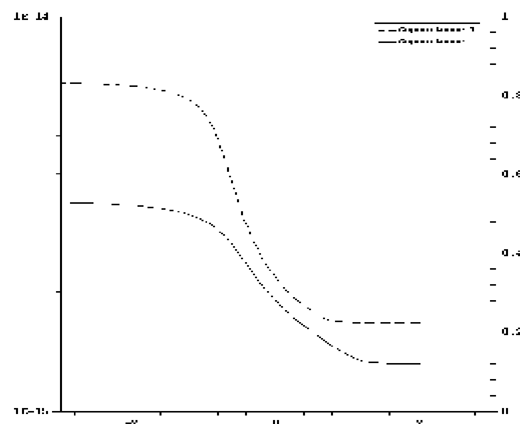


***Q1) c** eDensity Vs. X at Vg =3v.*

Q2



_____Cap. for Na=1e+18/cm3
+++++Cap. for Na=5e+18/cm3



++++Cap. for Tox=50 A
____cap. for Tox=100 A

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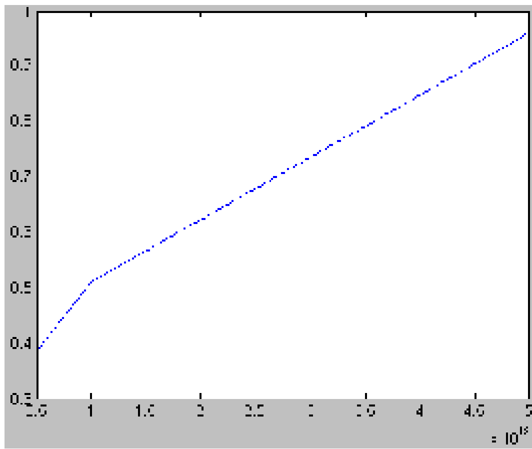
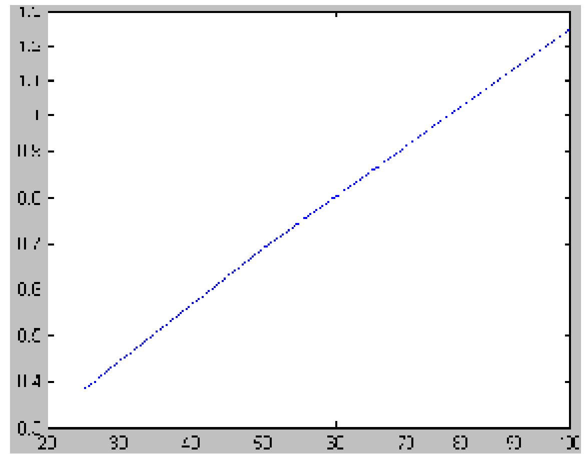
Q2)

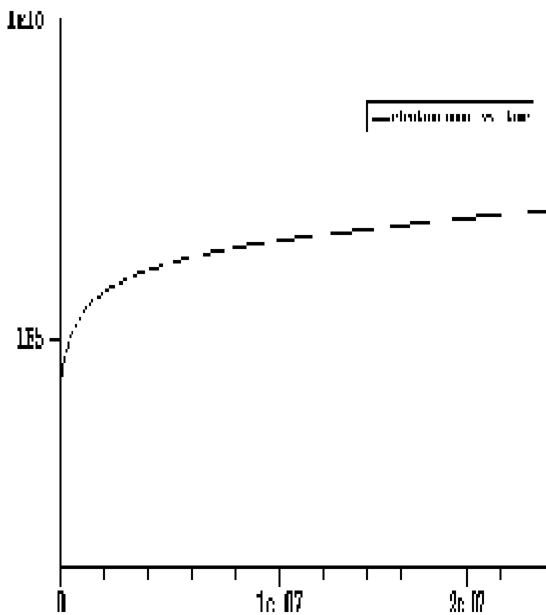


c)Fig. for Vt. Vs Na



d)fig. for Vt vs Tox.(A^0)

Q3) The electron concentration as a function of time is plotted in the figure



Relation: The minority carrier resp. time is directly related to the recovery time and the electron and period of freq. At which LFCV char. are obtained in Q1 is of same order as that obtained in Q3.time period for 1 hz. Freq. Is 1 sec. And it is found that for response time 10e-8 sec. Is observed at 0.96 sec.

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