Name:	**I - 40%**	**II-30%**	**III-30%**	
Neptun code:				
			Total Score:	**100%**

1st Part [10 marks for each question]

Q1/ Talk about the energy band structure of materials.

Q2/ Talk in detail about the operation of PMOSFET transistor.

Q3/ Explain oxidation process in details.

Q4/ Explain the electronic packaging levels.

2nd Part

Q5/ Fill the blanks: - [5M]

1- Adding capacitance near bond wire is to ……

2- What are the parasitic components appear in interconnects at high speed electronics

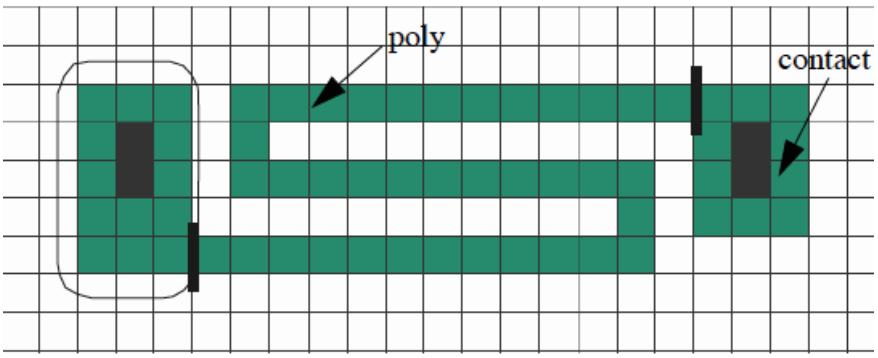
……., ……. and ……..

3- Reflections occur due to ……

Q6/ Answer the following questions: - [15M]

1- Calculate the sheet resistance $R_{\square}$ of the polysilicon film.

Hint: $\rho_s = \frac{\rho}{t} = R\left(\frac{W}{L}\right)$



2- What is the speed of the signal in the interconnect and why does the dielectric material affect the signal's speed?

Q7/ List five advantages of PBGA over leadframe: - [10M]

1- 4-

2- 5-

3-

3rd Part

Q8/ Perform the necessary calculations, draw a bounce diagram, and sketch the voltage at the load for a setup in which the battery voltage is 100V, the battery internal impedance is 75 Ω, the line impedance is 50Ω, the load impedance is 30 Ω, the line has a relative dielectric constant of 9, and the line length is 200m: -[30M]