

Name:	I - 40%	II-30%	III-30%	
Neptun code:				
<b>Total Score:</b>				<b>100%</b>

**1<sup>st</sup> Part** [10 marks for each question]

Q1/ Explain the types of crystal.

Q2/ Talk in detail about metal oxide semiconductor field effect transistor MOSFET (definition, structure and types).

Q3/ Talk in detail about the operation of NMOSFET transistor.

Q4/What are the packaging phases? Explain one.

**2<sup>nd</sup> Part**

Q5/ Fill the blanks: - [5M]

- 1- The raw material for silicon manufacture is .....
- 2- The challenge of IC packaging to identify and accommodate ....., ..... and ..... requirements inherent in the IC.
- 3- The oldest packaging technique is .....

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

- 1- When may the transmission line effects not be ignored?
  
- 2- What is the skin effect?
  
- 3- What does Spread Spectrum Clocking (SSC) technique use to overcome EMI issues?

Q7/ What are the six families of SI/PI/EMC problems? [10M]

- |    |    |
|----|----|
| 1- | 4- |
| 2- | 5- |
| 3- | 6- |

**3<sup>rd</sup> Part**

Q8/ Sketch the waveforms of  $V_S(t)$  and  $V_L(t)$  in the term of  $V_o$  over  $6\tau$ : -[30M]

Hint: Draw Bounce diagram.

