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BT-5 / D-17

VLSI TECHNOLOGY

Paper–ECE–305 N

Time allowed : 3 hours] *[Maximum marks : 75*

Note :- *There are **eight** questions in all organized in four units and each unit is having **two** questions. The candidate shall have to attempt **five** questions in all, selecting at least **one** question from each unit.*

Unit–I

1. (a) Explain in detail one method for the growth of single crystal silicon. 8

(b) How the flats on semiconductor wafer can be identified? 4

(c) Why clean room is required for the IC fabrication process? 3

or

2. (a) There are a number of defects present in the real crystal as compared with ideal crystal. Briefly explain for these defects. 5

(b) How many wafer shaping processes are there? Briefly explain. 5

(c) Draw the fabrication process steps of p-n diode. 5

Unit–II

3. (a) Explain the methods to deposit silicon dioxide and properties of deposited silicon dioxide. 8

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(b) How many isolation techniques are used in VLSI circuits? Briefly explain with proper diagrams. 7

or

4. (a) How thermal oxidation is different from CVD oxidation? Which one is preferred in your opinion and why? Give justification. 5

(b) How wet oxidation is used to grow oxide layers? What are the properties of oxides grow using wet oxidation?

(c) Explain the different oxide induced defects. How they can be removed or prevented? 5

Unit–III

5. (a) How many diffusion profiles are there to be followed for diffusion? Explain with suitable expressions. 6

(b) Draw and label properly the schematic of ion-implantor. 5

(c) What do you understand by shallow junctions? How it can be formed? 4

or

6. (a) What do you understand by implant damage? Explain how these occur and how these can be prevented? 5

(b) How many methods are there to measure the diffused layer? Explain. 6

(c) What is ion range? Illustrate with proper diagram ion range and distribution of ions with this range. 4

Unit–IV

7. (a) Draw the steps of pattern transfer using optical lithography. 4

   (b) Explain Plasma CVD deposition method. 6

   (c) What is electromigration? How it occurs? Is it beneficial or not? Justify your answer. 5

or

8. (a) What do understand by the term self-aligned? How it is used in the fabrication process? Explain with suitable figures. 5

   (b) What do you understand by metallization? How many methods are there for metallization? Explain one of the methods in detail with proper diagrams. 10