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Total No. of Questions: [09]

B.Tech. (ECE) (Semester 7th)
VLSI TECHNOLOGY
Subject Code: BECED1-731
Paper ID: [18111339]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a) What are the specific properties of a Single Crystal? Justify your answer with a neat diagram.
b) What are Frenkel's and Schottky's defects? Draw a neat diagram of each.
c) Differentiate between different SiO_2 layers.
d) How diffusion limited oxidation differs from reaction rate limited oxidation?
e) What do you understand of the term Bias in IC technology? What does it signify?
f) Why dark space is created in dc glow discharge?
g) What are the desirable features of lithography?
h) What is the significance of using Epitaxial layer in Bipolar IC fabrication process?
i) How mass transport limited deposition regime differs from reaction rate limited regime?
j) What is Interstitialcy mechanism of diffusion? Elaborate with the help of a neat sketch.

Section – B **(5 marks each)**

Q2. Explain the kinematics of Vapor phase Epitaxial growth
Q3. Explain the process of oxide volume expansion during thermal oxidation.
Q4. Briefly explain dissociation, ionization, and dissociation attachment and dissociation ionization as applicable to plasma etching in IC technology.
Q5. What are the salient features of lithography? Explain the steps involved in lithography for IC fabrication with neat diagrams and associated chemical reactions involved.
Q6. Discuss different packaging types and packaging considerations in IC technology.

Section – C **(10 marks each)**

Q7. With the help of neat sketches, discuss in detail the process steps involved in CMOS IC fabrication.
Q8. How diffusion of a dopant is modelled in VLSI technology? State and develop Fick's 2nd law of diffusion and propose its solution in different regimes of diffusion.
Q9. What are the salient features of using Deal-Grove's oxide growth Model? Explain the kinematics of oxidation in detail using this model.