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Roll No. :

328844(28)

B. E. (Eighth Semester) Examination, April-May 2021

(New Scheme)

(Et&T Engg. Branch)

**MICROELECTRONIC DEVICES
& VLSI TECHNOLOGY**

(Elective)

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

***Note : Part (a) of each question is compulsory
having 2 marks each and attempt any two
parts from (b), (c) and (d) from each question
having 7 marks each.***

Unit-I

1. (a) Name the types of technologies used in IC. 2

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- (b) Explain Czochralski (CZ) technique with suitable diagram. 7
- (c) Draw and explain : (any one) 7
- (i) Bridgeman technique
- (ii) Float zone process
- (d) A Silicon ingot with 0.5×10^{16} boron atoms/cm³ is to grown by CZ method. What should be the concentration of Boron in the melt to obtain the required doping concentration. The segregation coefficient of boron is 0.8. 7

Unit-II

2. (a) What is the use of polysilicon deposition in MOS devices? 2
- (b) Explain thermal oxidation and purpose of using it. 7
- (c) Draw and explain any two types of Dielectric deposition techniques. 7
- (d) Compare the oxide thickness grown for short time and long time oxidation at a temperature of 1200°C

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by wet oxidation method. At 1200°C, $A = 0.05 \mu\text{m}$
and $B = 0.725 \mu\text{m}^2/\text{h}$, $\tau = 0$. 7

Unit-III

3. (a) Define Flick's diffusion law. 2
- (b) Explain diffusion profile. 7
- (c) Explain implantation mechanism. 7
- (d) Explain high energy implantation. 7

Unit-IV

4. (a) Define Epitaxy. 2
- (b) Explain Molecular Beam Epitaxy. 7
- (c) Explain X-ray Lithography. 7
- (d) Draw and explain physical vapour deposition. 7

Unit-V

5. (a) Name the types of MOS transistor. 2

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- (b) Explain threshold voltage and operation of MOSFET. 7
- (c) Write down the steps of MOSFET fabrication with suitable diagram. 7
- (d) Explain MOS capacitance and equivalent circuit. 7