8E8021

Roll No.

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B. Tech. VIII Sem. (Main / Back) Exam., April – May 2018
Electronics & Communication Engineering
8EC1A IC Technology

Time: 3 Hours

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Maximum Marks: 80
Min. Passing Marks: 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

1. NIL 2. NIL

UNIT-I

Q.1 (a) What are the basic features of float zone growth? Give its advantages and disadvantages. Explain the top seed and bottom seed. [8]

(b) A boron – doped crystal is measured at its seed end with a four-point probe of spacing 1mm. The (V/I) reading is 10 ohm. What is the seed end doping and the expected reading at 0.95 fractions solidified? [8]

OR

Q.1 (a) What is electronic grade silicon (EGS)? Draw and explain the schematic of a CVD reactor used for EGS production. [8]

(b) Discuss the different kinds of crystal defects with diagrams. [8]

UNIT-II

Q.2 (a) Discuss the oxidation growth mechanism, show that Deal-Grove mode oxidation,

$$\frac{d_o}{A/2} = \left[1 + \frac{t + \tau}{A^2/4B}\right]^{1/2} - 1, \quad \text{reduces to}$$

$d_o^2 = Bt$ for long times and to $d_o = \frac{B}{A}(t + \tau)$ for short times [10]

(b) List possible ways of growing an oxide on a substrate without forming oxidation induced stacking faults. [6]

OR

Q.2 (a) Derive expressions of concentration gradients for the erfc and Gaussian distributions. http://www.rtuonline.com [10]

(b) What are the commonly used diffusion profile measurement techniques? [6]

UNIT-III

Q.3 (a) What do you mean by epitaxy? Discuss the several aspects of silicon vapor phase epitaxy. [8]

(b) Explain a basic chemical vapor deposition system. [8]

OR

Q3 (a) Draw and explain molecular beam epitaxy (MBE) growth system. [10]

(b) Explain the epitaxial evaluation process methods. [6]

UNIT-IV

Q.4 (a) Draw the schematic lithographic process. Explain the process of contact and proximity printing. [10]

(b) Draw and explain the process for generation of a photo mask. [6]

OR

Q.4 (a) What are the commonly used analytical techniques to measure plasma parameters? Explain in detail. [6]

(b) Discuss the properties of an etching process. What are the major distinctions between reactive ion etching and parallel plate plasma etching? [10]

UNIT-V

Q.5 Discuss the following terms in brief: [4×4=16]

(a) Trench Isolation

(b) Planarization

(c) LOCOS method

(d) Junction and oxide Isolation

OR

Q.5 (a) Explain the IC fabrication process. [8]

(b) What are the fundamental considerations for CMOS IC technology? [8]