

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – III • EXAMINATION – SUMMER • 2014****Subject code: 734202****Date: 05-06-2014****Subject Name: IC Fabrication Technology****Time: 02:30 pm - 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Define Photolithography and each sequence of optical lithography techniques with positive and negative resist. **07**
- (b) What is the difference between positive and negative resist? What is the difference between emulsion and chrome mask? **07**
- Q.2** (a) In VLSI why E-beam lithography is widely used? What is PMMA? Discuss E-beam lithography. **07**
- (b) Discuss effect of sodium contamination on the performance of pMOS and nMOS Transistors. **07**
- OR**
- (b) Explain electrostatic discharge damage in IC. Discuss protection network in the circuit. **07**
- Q.3** (a) Explain the difference between transport limited and reaction rate limited oxidation of silicon. **07**
- (b) What is Hot wall and Cold wall CVD techniques? **07**
- OR**
- Q.3** (a) What is diffusion? Explain predeposition, drive-in technique to introduce phosphorus impurity using POCl_3 as a liquid source. Also explain the role of oxygen & O_2 pressure using predeposition technique. **07**
- (b) What is sputtering? Describe RF magnetron sputtering. **07**
- Q.4** (a) What is wet and dry etching? Which technique is generally used to get anisotropic etching? Why? **07**
- (b) Explain role of O_2 in furnace diffusion process. Explain Solid Solubility. **07**
- OR**
- Q.4** (a) Explain ion-implantation technique to introduce impurity in silicon. Why it is used for shallow junction formation. **07**
- (b) Explain in detail Multilevel Metallization. **07**
- Q.5** (a) Explain high current implantation technique to introduce impurity in silicon at room temperature. Why annealing is required after implantation process? **07**
- (b) Why Al is the most frequently used metal for the purpose of metallization. **07**
- OR**
- Q.5** (a) Explain need of shallow junction in smaller geometry devices for VLSI Design? **07**
- (b) What is PMMA? Explain Ion-Beam Lithography. Why proximity effect is negligible in this technique? **07**
