Seat No.: _____ Enrolment No._____

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**

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