Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. SEMESTER III–EXAMINATION – WINTER 2015

Subject code: 2734202 **Date: 04/12/2015**

Subject Name: IC Fabrication Technology

Time: 2:30 PM to 5:00 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)**	Explain in detail Alpha particle induced soft errors.	**07**
	(b)	How RC time constant is decreased in multilevel metallization?	**07**
Q.2	**(a)**	What is clean room? Why clean room facility is required for the fabrication of ICs? Write down clean room classification as per federal standards 209D.	**07**
	(b)	Explain the different steps of wafer manufacturing.	**07**
		OR	
	(b)	What is Solid Solubility? Explain the role of O_2 in diffusion process.	**07**
Q.3	**(a)**	Discuss effect of sodium contamination on the performance of pMOS and nMOS Transistors.	**07**
	(b)	Explain the difference between transport limited and reaction rate limited oxidation of silicon.	**07**
		OR	
Q.3	**(a)**	What is PMMA? Explain Ion-Beam Lithography. Why proximity effect is negligible in this technique?	**07**
	(b)	Explain Predeposition and Drive-in techniques to introduce phosphorous impurity in p-type<100> silicon Substrate. Explain importance of O_2 gas mixed with nitrogen gas.	**07**
Q.4	**(a)**	What is sputtering? Explain RF magnetron sputtering to deposit Al alloys for shallow junction device.	**07**
	(b)	Explain Junction Spiking and Electromigration in Al film.	**07**
		OR	
Q.4	**(a)**	Explain high current implantation technique to introduce impurity in silicon at room temperature. Why annealing is required after implantation process?	**07**
	(b)	Why AlSi and AlSiCu are used in place of pure Al in fabrication of VLSI Circuit?	**07**
Q.5	**(a)**	Explain need of shallow junction in smaller geometry devices for VLSI Design?	**07**
	(b)	Explain isotropic and anisotropic etching? Describe RIE.	**07**
		OR	
Q.5	**(a)**	Compare followings: (i) Positive and Negative Resist (ii) Emulsion and Chrome Mask	**07**
	(b)	In VLSI why E-beam lithography is widely used? Discuss E-beam lithography.	**07**

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