Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1720311   **Date: 14/07/2012**
Subject Name: Microelectromechanical Systems
Time: 10:30 am – 13:00 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)**	Discuss various applications of Smart materials and Microsystems.	**07**
	(b)	Why we need microfabrication for the development of IC fabrication process?	**07**
Q.2	**(a)**	Discuss conductometric gas sensor in detail.	**07**
	(b)	Draw a sketch and explain comb- drive.	**07**
		OR	
	(b)	What is micromirror array? How it is useful in video projection?	**07**
Q.3	**(a)**	Compare major process steps in lithography and lift-off based pattering.	**07**
	(b)	What is the difference between Isotropic and Anisotropic etching?	**07**
		OR	
Q.3	**(a)**	Explain bulk michromachining in detail.	**07**
	(b)	A (100) silicon wafer is 500 μm thick. A mask consists of rectangular window of unknown size.The sides of the window are parallel to <100>.After wafer etch a hole size of 50 μm x 80 μm is formed on the other side of the wafer. Find the size of the mask window.The undercut rate is negligible.	**07**
Q.4	**(a)**	Explain the different process steps involved in the surface micro machining technology for realizing a polysilicon cantilever beam.	**07**
	(b)	Discuss methods to avoid stiction in RF-MEMS switches.	**07**
		OR	
Q.4	**(a)**	Write a note on Bimorph effect.	**07**
	(b)	Discuss Castigliano's theorems.	**07**
Q.5		Discuss Metal packages, Ceramic packaging, LTCC packages and Plastic packages.	**14**
		OR	
Q.5	**(a)**	Discuss Flip- Chip assembly technology.	**07**
	(b)	Discuss Ball- Grid array.	**07**

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