Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2024

Subject Code:3171107 Date:16-12-2024

Subject Name: Introduction to MEMS

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	What Are MEMS?	**03**
	(b)	Why silicon so strongly associated with MEMS?	**04**
	(c)	Define the role of actuators and sensors in the context of MEMS.	**07**
Q.2	**(a)**	List out the basic MEMS materials.	**03**
	(b)	Explain Thermal Growth Deposition.	**04**
	(c)	What is Thick-Film Screen Printing? Explain in details.	**07**
		OR	
	(c)	Explain the Electroplating.	**07**
Q.3	**(a)**	Compare bulk and surface micromachining.	**03**
	(b)	What do mean by Lithography? Explain.	**04**
	(c)	Explain Linearized Analysis of MEMS devices.	**07**
		OR	
Q.3	**(a)**	Explain System level modeling approach.	**03**
	(b)	What is wafer bonding? Explain it in detail.	**04**
	(c)	How MATLAB and Simulink tools used in MEMS?	**07**
Q.4	**(a)**	Why metal packages used in military applications?	**03**
	(b)	What is piezoelectricity? Explain with necessary diagram.	**04**
	(c)	What is Flip Chip? Explain its advantages.	**07**
		OR	
Q.4	**(a)**	Explain Sealing Techniques used for Mechanical Sensor Packaging.	**03**
	(b)	Explain Soldering Die Attach.	**04**
	(c)	Explain Optical Transduction Techniques.	**07**
Q.5	**(a)**	What is Q factor?	**03**
	(b)	Which are properties of the electromagnetic wave can be altered?	**04**
	(c)	Explain elements of smart sensors.	**07**
		OR	
Q.5	**(a)**	What are Electrostatic actuators?	**03**
	(b)	Explain block diagram of a typical resonant sensor.	**04**
	(c)	Explain any one MEMS application in detail.	**07**

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