

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2022****Subject Code:3171107****Date:12-01-2023****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) Explain MEMS technology in detail.	03
	(b) How Porous silicon is important in MEMS?	04
	(c) Explain any one Biomedical Application of MEMS.	07
Q.2	(a) Discuss Materials used in MEMS.	03
	(b) What is Transient Analysis of MEMS devices.	04
	(c) Explain different Mechanical Sensor Packaging used in MEMS.	07
	OR	
	(c) Explain Vibration Excitation and Detection Mechanisms in MEMS.	07
Q.3	(a) Explain Surface Micromachining technique in detail.	03
	(b) Explain two approaches used for MEMS simulation software.	04
	(c) Differentiate. Sensors vs Actuators	07
	OR	
Q.3	(a) Explain Electroplating LIGA in detail.	03
	(b) Explain Optical Techniques in detail.	04
	(c) Explain Behavioral Modeling Simulation Tools used in MEMS.	07
Q.4	(a) Explain Actuation Techniques in detail.	03
	(b) Explain Transducers in detail.	04
	(c) Explain in detail.. Electrochemical etch-stop.	07
	OR	
Q.4	(a) How Electrical Interconnects formed in MEMS.	03
	(b) What is Linearized Analysis of MEMS devices.	04
	(c) List and explain techniques for protection of the Sensor from Environmental Effects.	07
Q.5	(a) Explain Methods of Die Attachment in detail.	03
	(b) Explain Capacitive Techniques in detail.	04
	(c) Explain Resonator Design Characteristics.	07
	OR	
Q.5	(a) How Mechanical Isolation of Sensor Chips done. Explain in detail.	03
	(b) List and explain Smart Sensors used in MEMS.	04
	(c) Explain any one MEMS applications in detail.	07