BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BE | **SEMESTER: VII**
BRANCH: EEE/ECE/BT/MECH/CIVIL | **SESSION : MO/2019**

SUBJECT : MEC2019 MICRO-ELECTRO-MECHANICAL-SYSTEMS

TIME: 1.5 HOURS | **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

Q1	(a)	Why silicon is the most promising material for MEMS structures?	[2]
	(b)	Describe the process steps with diagrams to design cantilever beam using surface micromachining.	[3]
Q2	(a)	What are the advantages and disadvantages of bulk micromachining?	[2]
	(b)	What is chemical dry etching? Describe with diagrams. What are the main advantage and limitation of chemical dry etching?	[3]
Q3	(a)	Why crystallographic orientation is important for anisotropic wet etching?	[2]
	(b)	Describe the DRIE technique steps with the appropriate diagrams. What are the characteristics of DRIE?	[3]
Q4	(a)	What do you understand by Radiation Sensors? What are the different types of Radiation Sensors?	[2]
	(b)	Draw the cross sectional view Piezoresitive accelerometer device. Draw the fabrication steps of the device.	[3]
Q5	(a)	What are the major properties of micro-sensor?	[2]
	(b)	Write down the advantages of Piezoelectric transducers. Write down the governing equations necessary for the Piezoelectric transducers.	[3]
Q6	(a)	Briefly describe the CVD technique with appropriate equations used for depositing Silicon Oxide.	[2]
	(b)	Why wafer bonding is required? How silicon wafer can be bonded with Glass wafer for MEMS devices?	[3]

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