

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

**CLASS: BE
BRANCH: ECE/MECH**

**SEMESTER: VII/ADD
SESSION : MO/2018**

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) What are the advantages to make the micro-sized devices? [2]
(b) Why water bug can float easily on water, whereas we can't? [3]
- Q2 (a) Why Wheatstone bridge structure is used to design sensor? [2]
(b) How does stiction occur during drying process of fabricating cantilever beam? [3]
- Q3 (a) What are the differences between isotropic and anisotropic etching? [2]
(b) What is RIE? Describe with diagrams. What are the advantages of RIE? [3]
- Q4 (a) How wet etching can be used for anisotropic etching? [2]
(b) Describe the process steps with diagrams to design cantilever beam using bulk micromachining. [3]
- Q5 (a) What is micro-transducer? [2]
(b) What is the "Pull-in" condition for an electrostatic actuator? Find the expression of the "Pull-in" voltage of an electrostatic actuator? [3]
- Q6 (a) What are the advantages of Piezoresistive sensing over capacitive sensing? [2]
(b) Why Piezoresistive sensing depends on the ambient temperature? What are the methods of temperature compensation for Piezoresistive sensors? [3]

:::: 12/09/2018 M :::::