

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII EXAMINATION – SUMMER 2016****Subject Code: 180303****Date: 16/05/2016****Subject Name: Biomedical Microsystems (Department Elective-II)****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.

- Q.1** (a) Draw and explain negative & positive photoresist action. Give examples of negative & positive photoresist & their respective etchants. **07**
 (b) Explain in detail LIGA Process. **07**
- Q.2** (a) Discuss in detail the process of fabrication of Single Crystal Silicon Substrate. **07**
 (b) Explain the steps of packaging in detail. Also explain what is die attach process and two approaches to achieve the same. **07**
- OR**
- (b) Also explain various wafer bonding techniques and chemical mechanical polishing technique. **07**
- Q.3** (a) Explain Bulk Micromachining Technique along with Steps of SCREAM Process. **07**
 (b) What is damping and various sources of damping? Explain damping in electrical systems. **07**
- OR**
- Q.3** (a) Explain surface micromachining technique. Also explain SUMMiT Process. **07**
 (b) Explain accelerometer as a MEMS Sensor. Also enlist the factors that led to use of Piezo-resistive property in MEMS Based Sensors. **07**
- Q.4** (a) Explain Biocapsule assembly and loading for Islet cell replacement therapy. **07**
 (b) Discuss Quantum Dots along with their properties and their application in In Vitro Immunoassays. **07**
- OR**
- Q.4** (a) Explain structure and composition of metal nanoshells. Also explain drug delivery systems based on nanoshells. **07**
 (b) What are the various challenges faced in current oral drug delivery system and discuss MEMS based device used to alleviate these issues? Also enlist various materials used in MEMS devices. **07**
- Q.5** (a) Discuss in detail various materials used for fabrication of MEMS Devices stating their properties and applications. **07**
 (b) Discuss the applications of vascular zip codes in diagnostics. **07**
- OR**
- Q.5** (a) Explain structure of Gold nanoshells along with their biomedical applications. **07**
 (b) Explain scaling issues in MEMS and scaling in fluidic systems. **07**
