## MANIPAL INSTITUTE OF TECHNOLOGY Manipal University

## SIXTH SEMESTER B.Tech. (E & C) DEGREE END SEMESTER EXAMINATION MAY/JUNE 2016 SUBJECT: BioMEMS AND MICROSENSORS (ECE -322)

## TIME: 3 HOURS MAX. MARKS: 50 Instructions to candidates • • Answer ANY FIVE full questions. • • Missing data may be suitably assumed. •

- 1A. Describe how X-ray lithography be utilised to fabricate high aspect ratio (100:1) microstructure stamps. Explain each step of the process with neat diagrams and further indicating the materials utilised.
- 1B. Explain how real estate be saved by utilising silicon bonded wafers.

Reg. No.

- 2A. Explain how pumping speed of a fluid be increased through microtube.
- 2B. Explain how principle of MOSFET be utilised in constructing chemical sensors. Explain construction and working of such a device.
- 3A. a) What is HNA etchant? Where it is used.
  - b) Name two anisotropic etchants.
  - c) CalSpec means -----
  - d) Hybridization means -----
  - e) Micro-needles are ----- drug delivery devices.
  - f) LSPR resonance shift is due to -----
- 3B. How surface plasmon resonance be excited in metallic nanostructures?
- 4A. Explain the principle of magnetic bead based bio-sampling for the case of sandwich immune assay.
- 4B. Explain, clearly indicating the materials be utilised in each case, a lab-on- chip (LOC) device to detect oxygen partial pressure, glucose and Lactose.

5A. Compare and contrast different fluid propulsion techniques in micro-fluidic technology.

- 5B. Explain the following: a) Anodic bonding b) Surface micro machining.
- 6A. State four applications of electronic nose. (5+5)
- 6B. With neat diagram explain how Molecular gate be utilised as a filter-out the bio molecules.

(4+6)





(3+7)

(7+3)

(6+4)

(4+6)