Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University

SIXTH SEMESTER B.Tech. (E & C) DEGREE END SEMESTER EXAMINATION
MAY/JNUE 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.	What is sacrificial layer in the MEMS technology? With proper flow chart explain how it is utilised to fabricate moving parts in MEMS technology. Name three sacrificial layer materials.
1B.	Describe two CVD techniques with neat schematics. Compare and contrast those two techniques.
1C.	Explain how real estate be saved by utilising silicon bonded wafers.
	(4+3+3)
2A.	Explain the following: a) Surface tension. b) Opto-electro wetting.
2B.	With neat diagram explain electrospray ionising system to analyse chemical / biological anlytes by using Mass spectrometry.
	(5+5)
3A.	a) Micro-needles are --- drug delivery devices. b) Neumann formula is ---------- c) Principle of dielectrophoresis is ---------- d) In bright field microscopy the light is --------- scattered, while in dark field microscopy the light is ---------- scattered. e) In Raman scattering, the scattered light has --- components
3B.	Explain fabrication and working of the Inter Digital Transducer (IDT) in SAW sensors
	(5+5)
4A.	Describe with a clear flow chart the concept of bio-sampling and immune assay procedure in a Lab-On-Chip devices.
4B.	Describe the nano-sphere lithography (NSL) technique to fabricate nano-structures on a given substrate. How the procedure be modified to obtain different shape nano-structures.
	(5+5)
5A.	Describe how the concept of Lab-On-Chip be applied to analyse the blood samples for their oxygen partial pressure, glucose and lactose.
5B.	Describe the electronic nose. Describe its applications in various fields.
	(6+4)
6A.	Describe the following: a) Calorimetric spectroscopy. b) Continuous flow micropumps.
6B.	Describe mechanisms involved in dry etching techniques and its advantage over wet etching.
	(5+5)