Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

SEVENTH SEMESTER B.TECH. (E & C) DEGREE END SEMESTER EXAMINATION
NOVEMBER 2018
SUBJECT: MEMS (ECE - 4027)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates

- Answer **ANY FIVE** full questions.
- Missing data may be suitably assumed.

1A. Explain a technique alternative to bulk micro machining. Bring out utilization of different materials in this process.

1B. With neat schematics, describe two CVD techniques. Compare and contrast those two techniques with PVD techniques.

1C. Explain how real estate be saved in bulk-micro machining.

(4+3+3)

2A. Explain LIGA process for fabricating high aspect ratio micro features.

2B. With neat diagram explain electrospray ionising system to analyse chemical / biological analytes 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 Raman scattering, the scattered light has --------- components.

3B. Describe fabrication and working of the Inter Digital Transducer (IDT) in SAW sensors.

(4+6)

4A Describe the following: a) Calorimetric spectroscopy. b) Continuous flow micro-pumps.

4B. Describe mechanisms involved in dry etching techniques and its advantage over wet etching.

(5+5)

5A. State four applications of electronic nose along with its construction

5B. With neat diagram explain how Molecular gate be utilised as a filter-out the bio molecules.

(4+6)