

M. TECH.-III (MECHANICAL CAD/CAM) (CBCS – 2015 COURSE) :
WINTER - 2017
SUBJECT : ELECTIVE – I : MICRO-ELECTRO MECHANICAL SYSTEMS

Day : **Tuesday**
Date : **16/01/2018**

W-2017-2923

Time : **11.00 AM TO 02.00 PM**
Max. Marks : **60**

N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data if necessary.

Q.1 Discuss on the historical development of MEMS and microsystems. **(10)**

OR

Define MEMS and NEMS. Compare between micro electro mechanical systems and Nano electro mechanical system.

Q.2 Define surface Micromachining. How surface micro machining is implemented for fabrication of MEMS device? **(10)**

OR

Comment extensively on different techniques associated with MEMS.

Q.3 Explain thermal bimetallic bending and find vertical displacement at the free end of the cantilever beam. **(10)**

OR

Define piezo-electric effect. Explain surface acoustic wave and flexural wave with neat diagram.

Q.4 Explain the levels of micro system packaging. Detail the unique features of microsystem packaging when compared to micro electronic device packaging. **(10)**

OR

What are the constraints involved in the micro system design and packaging?

Q.5 a) Briefly narrate the history of Nano materials. **(05)**

b) Give some present and future applications of Nano materials. **(05)**

OR

Define carbon Nano tube? What are the types of carbon Nano tubes highlight the properties of carbon Nano tubes? **(10)**

Q.6 Describe how Atomic Force Microscopy (AFM) can be used for manipulating atoms/ molecules. **(10)**

OR

Describe Magnetorheological finishing processes in detail and its applications.

* * *