

**R09****Code: 9A14602**

B.Tech III Year II Semester (R09) Supplementary Examinations December/January 2015/2016

**MEMS & NANOTECHNOLOGY**

(Mechatronics)

Time: 3 hours

Max. Marks: 70

A total of five questions are to be answered with at least two questions from each part

All questions carry equal marks

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**PART – A**

- 1 Define and explain the following terms:
  - (a) RF MEMS.
  - (b) Micro fluid systems.
  - (c) Bio-MEMS.
- 2 What do you mean by impurity doping? Give an example w.r.t. a semiconductor device. How can doping modify the physical parameters of the material?
- 3 Define the terms spring, damper and mass of an elemental mechanical system. Write down the elemental model equations of these elements respectively and define the terms used therein.
- 4 What do you mean by passive mechanical systems (PMS) and passive electronic systems (PES)? Explain with an example to each.

**PART – B**

- 5
  - (a) Explain band structure in solids and give analysis of Bloch theorem.
  - (b) Discuss Quadra pole and hyperfine splitting in Mössbauer spectroscopy.
- 6
  - (a) Write the applications and important properties of silicon carbides.
  - (b) Write a note on wear materials and nanoparticles.
- 7
  - (a) Explain the preparation of nano-powder, and give its characteristics.
  - (b) Explain magnetic properties of SiC.
- 8
  - (a) How to switching glasses with nanoparticles? Explain.
  - (b) Explain electro-optic and Acousto-optic effects.

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