B TECH
(SEM VIII) THEORY EXAMINATION 2017-18
MICRO AND SMART SYSTEMS

Time: 3 Hours   *Total Marks: 100*

Note: **1.** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   **Attempt *all* questions in brief.**   **2 x 10 = 20**

   a) What is the need of miniaturization?
   b) What are the application of smart material?
   c) What is the difference between sensor and micro sensor?
   d) What is the significance of sensors in smart material?
   e) Why silicon is used for smart material?
   f) What is Etching?
   g) What is heterogeneous layered beams
   h) What is the need of modelling in micro system?
   i) What is the scaling effects in Microsystems?
   j) What is biochemical phenomena?

SECTION B

2.   **Attempt any *three* of the following:**   **10 x 3 = 30**

   a) What is smart materials? Discuss the different types of smart materials?
   b) Discuss in detail about piezo resistive pressure sensor, conductometric gas sensor?
   c) What is micro machining? Discuss its process in detail?
   d) Explain Bimorph effect and Poisson effect?
   e) What is the need of integration of Microsystems and microelectronics and why?

SECTION C

3.   **Attempt any *one* part of the following:**   **10 x 1 = 10**

   a) What is MEMS? Compare this with Microsystem?
   b) What is micro system? Discuss in detail?

4.   **Attempt any *one* part of the following:**   **10 x 1 = 10**

   a) Explain how micromirror array are used for video projection?
   b) Explain in detail portable blood analyzer, piezoelectric inkjet print head?

5.   **Attempt any *one* part of the following:**   **10 x 1 = 10**

   a) Discuss about specialized materials for Microsystems in detail?
   b) Discuss different processes for micro fabrication?

6.   **Attempt any *one* part of the following:**   **10 x 1 = 10**

   a) Write short note on the following:
      (i) Residual stress
      (ii) Stress gradients
   b) Write short note on the following:
      (i) Anticlastic curvature of beams
      (ii) Torsion of beams and shear stresses

7.   **Attempt any *one* part of the following:**   **10 x 1 = 10**

   a) Discuss the Scaling effects inmechanical and magnetic domain of Microsystems?
   b) Discuss the Scaling effect in electrostatic domain, and in the optical domain?