

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-VIII • EXAMINATION – SUMMER 2014**

**Subject Code: 180303****Date: 27-05-2014****Subject Name: Biomedical Microsystems****Time: 10:30 am TO 01:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Define the following terminologies; **07**  
 (i) Bacteriophage (ii) Bandgap energy (iii) Nano shell  
 (iv) MEMS (v) Unit cell (vi) Lattice
- (b)** Discuss various applications of MEMS in various fields. **07**
- Q.2 (a)** Explain various processes used for doping in BioMEMS. **07**  
**(b)** Explain surface micromachining. **07**
- OR**
- (b)** Explain Bulk micromachining. **07**
- Q.3 (a)** Explain Miller's method of crystal orientation. **07**  
**(b)** What are the various combinations of sacrificial layer and structural layers used in MEMS? **07**
- OR**
- Q.3 (a)** Discuss the need of scaling in MEMS. **07**  
**(b)** Discuss computational issues of scaling in MEMS. **07**
- Q.4 (a)** What is the function of packaging in MEMS? Explain packaging process steps. **07**  
**(b)** Explain the diffusion properties of microfabricated biocapsule membrane. **07**
- OR**
- Q.4 (a)** What are the mechanisms to provide timed release of drugs? Explain advantages of using MEMS over other techniques. **07**  
**(b)** Explain the Biocapsule assembly and loading **07**
- Q.5 (a)** Discuss the physical process of quantum dot emission. **07**  
**(b)** Compare displacement and amphiphilic technique to render biocompatibility of quantum dots. **07**
- OR**
- Q.5 (a)** What is Bacteriophage? Give schematic representation and explain the protocol for in vivo phage screening and homing peptide characterization. **07**  
**(b)** Discuss the homing markers for application in drug delivery, gene delivery and vascular imaging. **07**

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