Seat No.: _____ Enrolment No._____

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; (i) Bacteriophage (ii) Bandgap energy (iii) Nano shell (iv) MEMS (v) Unit cell (vi) Lattice	**07**
	(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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