

**B.E. /B.Tech Arrear Examinations -November/December2012**  
**Biomedical Engineering(R-2008)**  
**VII Semester**  
**BM9026/BIOMEMS**

**Time : 3 Hours**

**Max. Marks : 100**

**Answer all questions**

**Part – A**

**10 x 2 = 20 Marks**

1. Compare Microelectronics and Microsystems.
2. What is photo resists? Mention its types?
3. Give the working principle of piezoactuator.
4. State thermal bimorph principle.
5. What is light modulator?
6. Mention the different types of light detectors used in MOEMS.
7. Define reynolds number.State how flow is classified using reynolds number.
8. What is thermocapillary effect?
9. What are the advantages of micro total analysis systems?
10. What is PCR? Mention its applications.

**Part – B**

**5 x 16 = 80 Marks**

11. (i) Describe the general procedure of photolithography. (8)  
(ii) Discuss in detail the materials used for MEMS fabrication. (8)
12. (a) (i) Explain in detail the working principle of electrostatic actuator. (8)  
(ii) Write short notes on Accelerometer based on thermal transfer principle. (8)  
(or)  
(b) (i) Explain working of suracemachined piezoresistive pressure sensor. (8)  
(ii) With neat diagram explain the working of micromachined piezoelectric flow sensor. (8)

13. (a) (i) Discuss the working of microlens with an application. (8)  
(ii) Explain the structure and working of beam splitter. (8)  
(or)
- (b) Explain in detail the principle and digital light processing technique used in digital micromirror devices. (16)
14. (a) Discuss in detail the different types of actuation methods used in microfluidics. (16)  
(or)
- (b) (i) Explain in detail structure and working of micropumps. (8)  
(ii) Derive the continuity equation for fluid flow in a microchannel. (8)
15. (a) (i) Explain in the design of drug delivery system using MEMS fabrication technique. (8)  
(ii) Write short notes on DNA hybridization. (8)  
(or)
- (b) Explain in detail how CAD is used in MEMS design with an application. (16)