

AQ-2799

**Faculty of Engineering & Technology**  
**M.E. (Digital Electronics) (Part Time/Full Time) Semester-II (C.G.S.-New) Examination**  
**Elective-II : MICRO ELECTRO MECHANICAL SYSTEM**

**Paper—2 UMEF 5**

**Sections—A & B**

**Time—Three Hours]**

**[Maximum Marks—80**

**INSTRUCTIONS TO CANDIDATES**

- (1) All questions carry marks as indicated.
- (2) Answer **THREE** questions from Section A and **THREE** questions from Section B.
- (3) Assume suitable data wherever necessary.
- (4) Illustrate your answers wherever necessary with the help of neat sketches.
- (5) Mobile Phone/Cell Phone prohibited in exam. hall.
- (6) Use pen of Blue/Black ink/refill only for writing the answer book.

**SECTION—A**

1. (a) Distinguish between the MEMS technology with microsystem with respect to their applications. 6
- (b) Explain with a block diagram the components of a microsystem. 7

**OR**

2. (a) Explain the difference between microelectronic and microsystem. 6
- (b) Discuss the MEMS, microelectronics and microsystem definitions with example. 7
3. (a) Explain the application of MEMS in telecommunication. 6
- (b) Discuss the aircraft sensor in detail. 7

**OR**

4. Explain in detail at least three applications of MEMS in industry. 13

5. (a) Explain the scaling in Geometry with example. 7  
 (b) Explain the following terms related to design consideration :  
 (i) Design constraints  
 (ii) Selection material. 7

**OR**

6. (a) List the types of scaling ~~laws~~ and explain any one in detail. 7  
 (b) Explain the effect that scale factor reduction has on electrical parameters of resistance capacitance and inductance. 7

**SECTION--B**

7. Discuss in detail the MEMS fabrication processes :  
 (i) Photolithography  
 (ii) Ion implantation. 13

**OR**

8. (a) Explain PECVD and APCVD with neat sketches. 7  
 (b) Explain the following terms :  
 (i) Light sources  
 (ii) Photoresist. 6  
 9. (a) Explain in detail Wet etching process in MEMS fabrication. 7  
 (b) Explain in brief the LIGA process. 6

**OR**

10. What is meant by packaging ? What are the special requirements for packaging material ? Which material is used for packaging ? 13  
 11. (a) Explain working principle of thermal sensor. Where these are employed ? 7  
 (b) Explain working principle of biosensor for measurement of blood glucose concentration in a patient. 7

**OR**

12. Write short notes on the following : 14  
 (i) Microgrippers  
 (ii) Micromotors  
 (iii) Microgears  
 (iv) Micropumps.