B.E. (Elect.& Telecommunication / Elect.& Communication Engineering) Seventh Semester
(C.B.S.)

Elective - I : Microelectro Mechanical Systems & System on Chip

P. Pages : 2 **NRT/KS/19/3540**

Time : Three Hours * 0 2 4 5 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Diagrams and chemical equations should be given whenever necessary.
11. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) What is a MEMS device? What are its advantages? **7**

b) Write short note on Micro-Mirror in Projector system. **6**

OR

2. a) What is the difference between Micro-structure and Microsystem? Explain with example. **7**

b) What are the types of Micro-accelerometers? Explain sensing mechanism of any one type. **6**

3. a) What is photolithography? What are different techniques of lithography? Explain any one. **7**

b) Explain process of wet bulk. Micromachining of a diaphragm with illustrations. **7**

OR

4. a) What are different types of Resists used in photolithography? Write in detail about resist SU8. **7**

b) What is sacrificial layer and its role in fabrication of MEMS devices? Explain with example of micro-cantilever. **7**

5. a) Which are different domains of sensor? Give example of each type of MEMS device and give list of static and dynamic performance characteristics of a sensor. **6**

b) What are types of Gas sensors? What is Gas Chromatography? **7**

OR

6.	a)	What is a sensor? What do you understand by Bio-sensor? Give examples.	**6**
	b)	Explain how capacitive sensing can be used for measuring acceleration?	**7**
7.	a)	List applications of RF MEMS devices.	**6**
	b)	Give design steps for RF switch.	**7**

OR

8.	a)	How to design RF MEMS antenna? Give steps.	**6**
	b)	Write short notes on RF Inductors.	**7**
9.	a)	Why MEMS device packaging is required? Explain types of packaging.	**6**
	b)	Why is silicon ideal material for MEMS fabrication?	**7**

OR

10.	a)	Discuss various materials used for MEMS device packaging.	**6**
	b)	Give design steps for microsystem. Packaging of pressure sensor.	**7**
11.	a)	What is System – On – Chip (SoC)? Explain architecture of typical SoC.	**7**
	b)	Explain design constraints of a micromachined system.	**7**

OR

12.	a)	What do you mean by scaling laws in MEMS devices?	**7**
	b)	Explain with diagram design flow with help of MEMS CAD.	**7**

****