B.E. Eighth Semester (Electronics Engineering) (C.B.S.)

Micro Electromechanical Systems & System on Chip

P. Pages : 2 **KNT/KW/16/7548**

Time : Three Hours * 0 2 5 0 * 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 miniaturization? State benefits of miniaturization. **6**

b) With neat sketch describe the working principle of Microactuator. **7**

OR

2. a) Write short notes on micro pressure sensor. **6**

b) Explain different micro – optical sensors. **7**

3. a) Differentiate between bulk micromachining and surface micromachining. **8**

b) Explain working principle of Chemical Vapor Deposition (CVD). **6**

OR

4. a) A silicon substrate is doped with Boron ions at 100 keV. Assume the maximum concentration after the doping is $30 \times 10^{18}/cm^3$. **8**
(Given Data : for Boron at 100 keV, Rp = 307.0 nm and $\Delta Rp = 69.0$ nm)
find : i) the dose (Q),
ii) the dopant concentration N(x) at the depth 0.15 µm.

b) Explain the LIGA process in details. **6**

5. a) Explain in brief about chemical sensors in MEMS. **7**

b) Explain thermal transducers in MEMS. **6**

OR

6. a) Explain cell based biosensors. **7**

b) Explain Rf transducers in MEMS. **6**

7.	a)	Explain MEMS Capacitors in detail.	**7**
	b)	Write short notes on Rf switches.	**6**

OR

8.	a)	Explain MEMS Inductors in detail.	**7**
	b)	Explain MEMS antennas.	**6**
9.	a)	Explain microsystem packaging with block diagram.	**7**
	b)	Explain why MEMS packaging is so important.	**6**

OR

10.	a)	Explain different types of MEMS packages.	**7**
	b)	Write short notes on wafer bonding.	**6**
11.	a)	Explain system on a single chip with block diagram.	**8**
	b)	Explain microsystem technology and applications.	**6**

OR

12.	a)	Explain selection of materials as design consideration of MEMS.	**8**
	b)	Write short notes on process design for microfabrication processes.	**6**

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