

## **VL 5091 MEMS and NEMS**

### **Important 2 Marks Questions**

#### **Unit I**

1. Enlist any two commercial MEMS and microsystems products available.
2. List the application of MEMS and Microsystems in the telecommunication industry.
3. Draw the cross section of typical diaphragm based micropump and briefly state its working.
4. What are shape memory alloys? List two applications of shape memory alloy.
5. List the advantages and disadvantages of using piezoresistors?
6. Write principle of optical sensors in MEMS.
7. Define resonant frequency.
8. Define thermal stress.
9. Give the applications of MEMS in biomedical.
10. Define stress and strain.

#### **Unit II**

1. Enlist the types of etching techniques.
2. Mention the major objectives of mechanical packaging of microelectronics.
3. Define pull-in effect.
4. Give the principle of electrostatic sensing devices.
5. Give the principle of electrostatic actuation devices.
6. List the applications of parallel plate capacitors.
7. What is the principle of inertia sensor?
8. List the applications of comb drive devices.
9. Define the sensitivity of accelerometer.
10. What is the principle of tactile sensor?

#### **Unit III**

1. List the different types of MEMS sensors.
2. How does piezo resistive pressure sensors work?
3. List four relevant points of comparison between wet etching and dry etching techniques.
4. Compare between Silicon and GaAs as materials for MEMS device fabrication.
5. What is Origin and expression of piezo resistivity?
6. Write the Mathematical Description of piezoelectric effect.
7. What is stress and deformation in membrane?
8. What is single crystal silicon?
9. What is piezoelectric coefficient matrix?
10. What is inverse effect of piezoelectricity?

#### **Unit IV**

1. State the working principles for Micro actuators.

2. Enlist the function and application of gyroscope.
3. Explain the process of chemical vapour deposition with neat figures.
4. What are the constraints involved in microsystem packaging?
5. Define Silicon Anisotropic etching.
6. Define Plasma etching and Reactive ion etching.
7. What is DRIE?
8. Mention the etchants using in gas phase etching process.
9. Define Bulk Micromachining.
10. What is Silicon and Anti-silicon method?

### **Unit V**

1. Compare Microsystems with Nano Technologies.
2. State the principle and uses of molecular dynamics.
3. Explain the signal mapping in Microsystems.
4. What are the parameters involved in designing interfaces for microsystem packaging?
5. What are the classes of polymers in general?
6. What are the categories of polymers?
7. List the mechanical properties of polymers.
8. List the features of polymers used in MEMS.
9. Define viscoelastic creep.
10. List the characteristics of PDMS.