

Unit-I

Short Questions

Define Sensor Terminology

Explain Sensor Classification

Write about Temperature sensors

Discuss Thermoresistive of sensor

Explain Sensor Resistance and temperature detectors

What is Silicon resistive thermistors

Define the Semiconductor of the sensor

About Piezoelectric of sensor

Write Humidity and moisture sensors

Write short Capacitive, Electrical conductivity, Thermal conductivity, time domain reflectometer, Pressure and Force sensors: Piezoresistive, Capacitive, force, strain and tactile sensors, Strain gauge, Piezoelectric.

Part-B

1. Explain the difference between MEMS and microsystems
2. Mention the type of sensor used to identify the presence of oxygen. Explain the operation of the sensor
3. Identify the right actuator used for Automatic Greenhouse Ventilation and explain the operation of the sensor
4. Identify the sensor in the diagram and explain its operation
5. Distinguish between Microelectronics and Microsystem.
6. Summarize the advantages and disadvantages of piezoelectric sensing and actuation.
7. Give the principle of electrostatic sensors and actuators.
8. Generalize the role of actuators and sensors in the context of MEMS.
9. Write the principle of pressure sensor in MEMS.

Unit-II

Aside from seat belts, airbags are the first thing drivers think of when it comes to staying safe on the road. In the case of a crash or collision, airbags coming to the rescue is a reassurance set in the back of many drivers' minds. Identify the sensors needed for the airbag deployment and explain it in detail.

Describe the role of semiconductor materials in the design of MEMS

Analyze the functional relationship between the actuating element and the transduction unit in a Micro actuator.

Tabulate the difference between Microelectronics and MEMS.

Explain in detail the operation of electrostatic micro motor with appropriate sketches

Summarize the advantages in Surface Micromachining.

Which material is popularly used as the sacrificial layer in surface micro machining process?

What is micromachining?

What is micro fabrication?

With neat labelled figures, demonstrate the steps involved in photolithography.

Give the applications of MEMS in biomedical.

Why silicon is used as a substrate material.

What is sputtering?

Define diffusion

Summarize the processing steps of photolithography with neat sketch.

Describe about physical vapour deposition with relevant diagrams.

List out the various etching process and explain in detail with relevant diagrams

Give short notes on diffusion process used in MEMS industry.

Show how oxidation principle is used in Micro system fabrication.

Examine about ion implantation technique to produce Microsystems.

Explain briefly LIGA process.

Unit-III

Define Actuators? Mention the different types of Actuation systems.

Design a micro actuator with a mems micro accelerometer suitable for an engineering application

Summarize the properties of Piezo electric materials.

Summarize the advantages and disadvantages of using piezoresistive sensors.

Generalize the principle of piezoelectric accelerometer.

Give the principle of operation of electrostatic sensors and actuators.

Summarize the advantages and disadvantages of electrostatic sensing and actuation.

Give the principle of operation of comb drive actuators.

Compare the working of Electrodynamic transducers and Electromagnetic transducers

Give the principle of Electromechanical transducers

Part-B

Discuss the electrostatic piezoelectric transducer in detail.

2. Explain capacitive type transducers.

3. With neat diagram explain Piezo electric accelerometer.

4. Discuss on electrostatic actuation model with neat diagram.

Relate factors involved in the performance of optical MEMS.

List the actuators for optical MEMS.

Interpret the operation of optical mirrors.

Interpret the need stress analysis in MEMS

List the applications of MEMS-driven mirrors

Interpret the need of Optical MEMS in display industry

List the applications of Scanning-based MEMS displays

Outline the part of optical MEMS for sensing

Give the Actuation principles for MEMS optical scanners

List the type of MEMS optical scanners

Describe about Optical MEMS from Micromirrors to Complex Systems.

2. Explain about optical applications of MEMS devices.
3. Assess the need for actuators and the types of actuators used for active optical MEMS applications
4. Discuss the categories and Sources in Optical MEMS.
5. Describe about the Capacitive RF MEMS switch and it's performance

Unit-IV

Introduction to Smart Grid

Importance and feature of SG (Smart Grid)

Architecture of SG

Communication network

IoT role in SG

Challenges of SG implementation

What is Smart Grid

Traditional Power vs Grid Smart Grid

Why Smart Grid

Write Smart Grid Components

Discuss Feature of Smart Grid

Draw Smart Grid Architecture

Explain Conceptual Model

Discuss about Electrical Network

Write about Smart Grid Electrical Network Architecture

IoT Role in Smart Grid

Unit-V

Write Concept of Internet of Energy

Evaluation of IoE concept

Discuss Vision and motivation of IoE

Draw Architecture, Energy routines

Discuss Information sensing and processing issues

Write about Energy internet as smart grid

Sense

- Movement
- Vibration
- Pressure
- Light
- Temperature
- Mass

Think

-