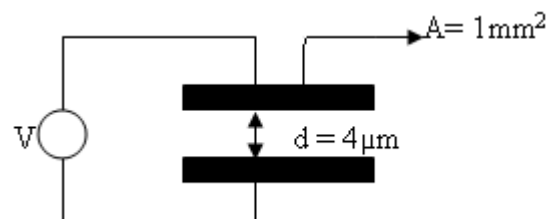




MCQ set#7: Microactuators and Microsensors

1. A mechanism that puts something into action is called:
a) Sensor
b) Actuator
c) DSP
d) All the above
2. Actuators are subdivision of:
a) Capacitors
b) Transducers
c) Piezoelectric
d) Transistors
3. Selection of the suitable actuations principle depends on:
a) Requirement forces
b) Amount of motion needed
c) Accuracy
d) All of the above
4. Performance measure contains
a) Linearity
b) Precision
c) Accuracy.
d) All of the above
5. is the smallest step the actuator can deliver:
a) Precision
b) Accuracy
c) Resolution
d) Sensitivity
6. Comb-Drive type actuator is a
a) Electrostrictive actuator
b) Thermal actuator
c) Magnetic actuator
d) Mechanical actuator
7. is based on the fact that current carrying conductor generates a magnetic field:
a) Voice call actuation
b) Magnetic actuation
c) Thermal actuation
d) Bending piezoelectric actuation
8. The main disadvantages of piezoelectric actuation include.....
a) Complexity of fabrication.
b) High price.
c) Bad performance.
d) None of the above.
9. Voice call actuators are based on.....
a) Temperature of atmosphere
b) Lorentz force
c) Pressure of atmosphere
d) None of the above
10. EMFI stands for.....
a) Electromechanical film.
b) Electromagnetic film.
c) a & b.
d) None of the above.
11.is a disadvantage of electromechanical films:
a) Light weight
b) Easy to cut
c) Large deformation
d) Low volume
12. The total thickness of the EMFI is.....
a) 0.3 – 0.7 μ m
b) 3 – 7 μ m
c) 30 – 70 μ m
d) None of the above
13. SMA advantages:
a) High force
b) Large deformation
c) Cooling by ambient material
d) All of the above
14. Liquid crystal display (LCD) is an application of.....
a) Mechanical actuator
b) Thermal actuator
c) Radiation actuator
d) Magnetic actuator
15. For the electrostatic actuator shown. If the medium between the capacitor plates is air, the capacitance, and the applied voltage will be:-
a) $5 * 10^{-4}$ F, $17.4 * 10^{-3}$ V
b) $2.2 * 10^{-12}$ F, $7.23 * 10^{-8}$ V.
c) $2 * 10^{-3}$ F, $5 * 10^{-3}$ V.
d) $3.5 * 10^{-12}$ F, $4.3 * 10^{-9}$ V
16. If a dielectric is inserted between the capacitor plates with relative permittivity of 7, the capacitance and the applied voltage will be:
a) $6.3 * 10^{-7}$ F, $4.5 * 10^{-3}$ V
b) $1.55 * 10^{-11}$ F, $10.33 * 10^{-8}$ V.
c) $5.33 * 10^{-3}$ F, $7.6 * 10^{-6}$ V.
d) $2.33 * 10^{-12}$ F, $5.6 * 10^{-9}$ V



17. The O/P of "MEASURED MEDIUM" is converted into electrical signal using:

- a) A/D converter
- b) Sensor
- c) A & B
- d) None of the above

19.When water is Ionized:

- a) PH decreases.
- b) Resistivity decreases.
- c) Acidity increases.
- d) All of the above.

21. Hall-Effect current Sensors are a type of.....

- a) Magnetic Sensors.
- b) Capacitive Sensors.
- c) Voltage Sensors.
- d) Bio-Sensors.

23. Capacitive sensors consists of :

- a) 2 electrodes and an electric material.
- b) 2 electrodes and a dielectric material
- c) 2 electrodes and a semiconductor material
- d) None if the above

25. Capacitor is used in a capacitive bridge to transform the into voltage.

- a) Temperature
- b) Light
- c) Displacement
- d) Humidity

27..... is/are advantages of the Capacitive Sensor:

- a) Small capacitances
- b) Possibility to be Integrated on a Chip.
- c) a & b.
- d) None of the above.

29..... sensors are most commonly used as smoke detection alarms:

- a) Radioactive chemical.
- b) Magneto resistive.
- c) Enzyme.
- d) SAW.

18. Voltage Sensors are a kind of :

- a) Magnetic Sensors.
- b) Acoustic Sensors.
- c) Semiconductor Sensors
- d) Temperature Sensors.

20. are based on the thermal effects of a current flowing into a conductor:

- a) Inductive voltage sensors
- b) Thermal voltage sensors
- c) Capacitive voltage sensors
- d) Semiconductor voltage sensors

22. Hall effect sensors are made up generally from semiconductors such as:

- a) Aluminum oxide.
- b) Potassium iodide.
- c) Zinc chloride.
- d) Indium antimonite.

24.....from the Properties of capacitive sensors:

- a) High Pressure Sensitivity.
- b) No-Hysteresis.
- c) a&b.
- d) None of the Above.

26. are based on the characteristics of the electric field:

- a) Thermal voltage sensor
- b) Capacitive voltage sensor
- c) Inductive voltage sensor
- d) Semiconductor voltage sensor

28.....sensors are very useful in environmental light measurements:

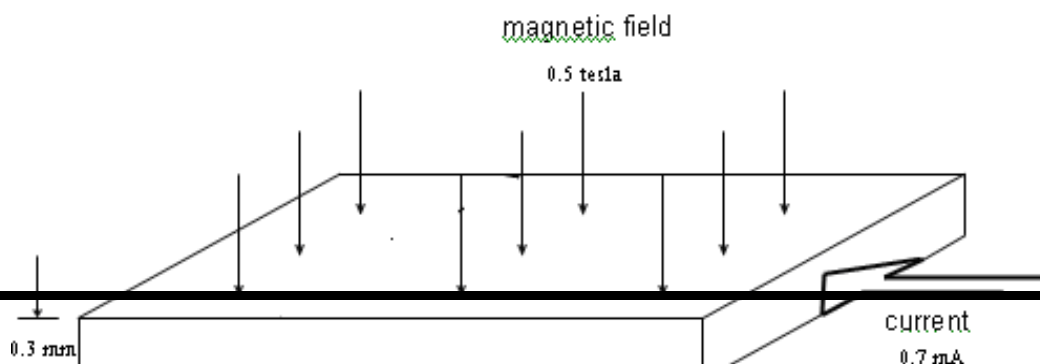
- a) Phototransistors
- b) Optical
- c) Photovoltaic
- d) None of the above

30.is/are thermal energy measurement sensor:

- a) Infrared sensors
- b) Thermocouples
- c) Semiconductor temperature sensors
- d) All of the above

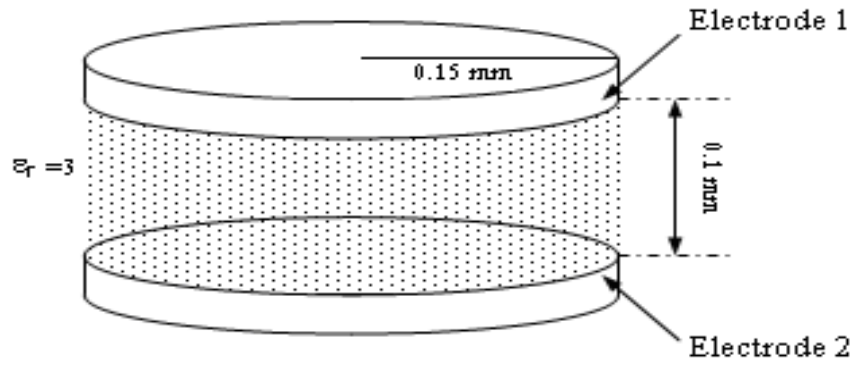
31. For the hall-effect microsensor shown, if the hall coefficient is $0.3 \text{ (m}^3/\text{ }^\circ\text{C)}$, the hall voltage will be:

- a) 0.2 V
- b) 0.35 V
- c) 0.4 V
- d) 0.45 V



32. For the capacitive microsensor shown, the capacitance is:

- a) 0.03 F
- b) 0.03 μF
- c) 0.03 nF
- d) 0.03 pF



33. For the micromachined Si diaphragm shown, the maximum deflection is:

- a) 12 mm
- b) 14 mm
- c) 16 mm
- d) 18 mm

