



SEAT NO -----

SARADAR PATEL UNIVERSITY, V.V.NAGAR

MARKS :70

[13]

B.Sc. SEM-6Physics

Subject Code: US06CPHY06

DATE:6/10/22

INSTRUMENTATION AND SENSORS

TIME:3:30 to 5:30

Q.1 Multiple Choice Questions

(10)

1. The transducer which works on the principle that the magnetic permeability is subjected to mechanical stress is ----- type

- (a) magnetostrictive (b) capacitive (c) resistive (d) piezoelectric

2. What can be measured using a cathode ray oscilloscope?

- (a) frequency (b) voltage (c) phase angle (d) all of these

3. The most suitable primary sensor for temperature measurements is -----

- (a) diaphragm (b) bimetallic strip (c) elastic cantilever (d) bourdon gauge

4. A solar cell is a _____ type of transducer

- (a) photo-conductive (b) photo-voltaic (c) photo-emissive (d) ionization

5. Which of these gauges is based on Boyle's law?

- (a) Knudsen (b) ionization (c) McLeod (d) pirani

6. ----- gauge is used to measure pressure of the order of 1 micron and below

- (a) strain (b) McLeod (c) ionization (d) pirani

7. Microphones are the transducer which converts sound pressure variation into----- analogous signal

- (a) electrical (b) digital (c) mechanical (d) optical

8. Opto electrical transducer convert a light beam into ----- signal

- (a) electrical (b) digital (c) mechanical (d) optical

9. Which of the following exhibits negative temperature measurements is _____

- (a) Nickel (b) Thermistor (c) Platinum (d) copper

10. Which type of microphone is used in telephone transmission circuit?

- (a) condenser (b) piezoelectric (c) carbon (d) electrodynamic

Q.2 Do as directed

(8)

1. A photo electric tube _____ type of transducer.

2. 1 micron is equal to -----torr

3. Bimetallic thermometer are usually employed in the range of 30°C to ----- $^{\circ}\text{C}$

4. The piezo-electric crystal material is ----- in nature

True or False

1. A photomultiplier tube is ionization type of transducer.

2. Glucose is used as an enzyme in a blood glucose monitor.

3. GaS is used as a sensing element in bio medical temperature sensors.

4. In output voltage of an eddy current type transducer is proportional to acceleration of plate.

Q.2 Answer any ten in short

(20)

1. Draw a diagram of a potentiometric resistance type transducer and state its principle.
2. Explain principle of measurements using capacitive transducer.
3. With a labeled diagram explain principle of ionization transducer.
4. Name the gauges for low pressure measurement.
5. What is thermo emf? On what factors it depends.
6. What is thermocouple? Explain its principle. (7) *What is smart sensor? State its Features.*
8. What is total radiation pyrometer? State its principles.
9. Draw the schematics of a condenser type microphone and label its components.
10. What are optical fibre chemical sensors? Explain.
11. Draw Orsat gas analysis apparatus and label its parts.
12. Using schematic diagram explain principle of a solid rod thermometer.

Q.3 Long questions (write any four)

(32)

1. Mention the advantages of getting electrical signal as output of a transducer
2. Draw the schematic diagram of measurement using an electromechanical transducer and explain working of it.
3. With necessary diagram explain various types of manometers for moderate pressure measurements.
4. Explain principle, construction and working of a McLeod
5. Explain the principle, construction, working of Bimetallic thermometer. State its
6. Explain principle, construction and working of solid rod thermometers.
7. What are Microphones? With necessary diagram explain the working of Piezo-electric Crystal type microphone.
8. Discuss in detail the non dispersive infrared gas analyzer.

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(2)