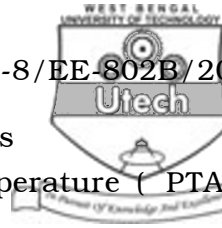


- iv) A quartz resonator is effective in measuring
 - a) speed
 - b) flow of fluid
 - c) force
 - d) temperature.
- v) On resistance Thermometry platinum is widely used for
 - a) large temperature coefficient of resistance
 - b) greater temperature range coverage
 - c) non-reactive to other metals mostly used in electrical circuitry.
- vi) Which of the following thermocouple combinations efficiently covers maximum temperature range ?
 - a) Copper-Constantan
 - b) Platinum-Rhodium
 - c) Copper-Iron
 - d) Chromel-Alumel.
- vii) As regards spectral response, Which of the following metals has nearest approach to human eye ?
 - a) Caesium
 - b) Potassium
 - c) Lithium
 - d) Sodium.
- viii) Considering illumination level change by about 1 : 1000 and spectral range coverage, which of the following materials is best suited ?
 - a) Lead sulphide
 - b) Cadmium sulphide
 - c) Thallium sulphide
 - d) Bismuth sulphide.
- ix) Angular or Rotatory sensor can best be realized by
 - a) a modified version of LVDT
 - b) a piezoelectric sensor
 - c) a plunger in coil arrangement
 - d) a stretched diaphragm sensor.



- x) An AD 590 sensor is generally used as
- a proportional to Absolute temperature (PTAT) sensor
 - a magnetic flux sensor
 - a force transducer
 - an accelerometer.
- xi) Venturimeter transducer works on the principle of
- pressure difference between two points of flowing fluid
 - temperature difference in two points in fluid
 - resistance change in fluid flow
 - electrical potential gradient between two points in flow line.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

- Explain the operating principle of optical pyrometer with proper diagram. Also mention its range and advantages.
- How can velocity of liquid through a pipeline be measured by using ultrasonic transducer ? Draw necessary diagram. What frequency range of ultrasonic wave is used by ultrasonic transducer ?
- Discuss briefly the use of platinum in metal resistance thermometric sensor.
- Give simple scheme of using quartz resonator piezoelectric arrangement for force sensing.
- What are the differences between Villari effect and Wiedemann effect ? How are these two effects used in developing magneto-elastic sensors ?



GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. What type of radiation can be detected by a Geiger-Müller counter ? Describe with neat diagram a Geiger-Müller counter and explain how it operates. What are the gases in these tubes and pressure range at which they operate ?

8. Describe the basic principle of a Hall Device. Show how it can be used for magnetic field sensor.

On what factors and parameters of the sensor, does the hall voltage output depend for a given field condition ?

How is the performance of a hall sensor evaluated ? What are its primary and secondary sensitivities ? $4 + 4 + 4 + 3$

9. a) Explain what you understand by pH of a solution ?
b) How is pH measured in the laboratory ?
c) What are the precautions required to be taken in case of measurement of pH ? $2 + 10 + 3$

10. How can the capacitive transducer be used to measure the level of non-conducting liquid ? What special arrangement should be done while measuring the level of conducting liquid ?

What do you mean by frequency response of a capacitive transducer ?

Mention different factors on which capacitive transducer depends. $7 + 5 + 3$

11. Write short notes on any *three* of the following : 3×5
a) Smart sensors
b) Photovoltaic cell
c) Thermistors
d) IC temperature sensors
e) LVDT.