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SARDAR PATEL UNIVERSITY

B.Sc. Fifth semester

Instrumentation (Vocational)

US05CINV21

Process Measurement Techniques-1

Thursday, 24/12/2020

Time: -2:00 To 4:00 PM **Marks: - 70**

Q.1 Choose the correct answer (Attempt all) (10)

(1) What is temperature value in Celsius at absolute zero temperature?
(a) 273 (c) - 273
(b) 0.0 (d) - 192

(2) Which of following is ideal gas equation?
(a) PV = RT (c) PV = n RT
(b) PT = n VT (d) PR = TV

(3) Which of the following scale is accepted as international scale for temperature measurement?
(a) Fahrenheit. (c) Celsius.
(b) Rankin. (d) Kelvin.

(4) What is the temperature coefficient of Thermistor?
(a) Positive. (c) Negative.
(b) Zero. (d) None of above.

(5) Which method is suitable for measuring temperature of remotely placed of object?
(a) Total radiation pyrometer. (c) Thermocouple thermometers.
(b) Bi-metallic strip thermometers. (d) RTD thermometers.

(6) Which of following sensor offers highest linearity?
(a) Thermistors. (c) Thermocouples.
(b) RTD. (d) Bimetallic strip.

(7) What is the principle of operation of the U tube manometer?
(a) Electromagnetic balance. (c) Hydrostatic balance.
(b) Electrostatic balance. (d) Pneumatic balance.

(8) Which of following can be measured by Piezo meter?
(a) Gauge pressure. (c) Vacuum.
(b) Absolute pressure. (d) Differential pressure.

(9) What happens to the thermal conductivity when the pressure in the chamber is reduced?
(a) Decreases. (c) Increases.
(b) Remains unaltered. (d) None of above.

(10) Which type of bourdon gauge has small tip travel?
(a) C type. (c) Spiral.
(b) Helical. (d) None of above.

Q2 Fill in the blanks. (Attempt all) (08)

(1) The energy radiated by the heated object is _____ power of temperature.
(2) The steam point for common salt water is _____
(3) _____ is used to measure Atmospheric pressure.

(4) _____ type of diaphragm gives higher displacement.
True / False.

(5) Doctor's thermometer measures temperature in Celsius unit.

(6) The characteristics curve of thermocouples is highly exponential in nature.

(7) Atmospheric pressure is constant everywhere.

(8) Thermistors have higher sensitivity than RTD sensors.

Q3 Answer in short (Attempt Any ten) **(20)**

(1) List various scales used for temperature measurement and write the expressions relating various temperature scales.

(2) With the typical range of operation, give the name of the liquids that can be used in liquid in glass thermometer.

(3) Define temperature.

(4) Discuss the See back's experiment of the thermoelectricity.

(5) What is temperature coefficient? Give examples of the devices having positive and negative temperature coefficient.

(6) Write a note on thermopile? And list its characteristics features.

(7) Explain why the Inclined U tube manometer has higher sensitivity.

(8) Define Atmospheric, Absolute, static and Dynamic pressure.

(9) Explain how the error in measurement of pressure by bourdon gauge can be reduced.

(10) List the advantages and disadvantages of the U-tube manometer.

(11) Explain the working of ionization gauge.

(12) What is thermal conductivity?

Q4 Write in Detail. (Attempt Any Four) **(32)**

(1) With necessary circuits explain the principles of working of liquid in glass type thermometer.

(2) Write a note on different types of filled system thermometer. List their advantages and disadvantages.

(3) Write a note on thermocouple instrumentation using PMMC and Potentiometers.

(4) Discuss in detail the construction of RTD probe and explain its characteristics curves.

(5) Write a note on U tube manometer with necessary diagrams and expressions.

(6) Write a note on ring balance manometers with necessary diagrams and list the advantages and disadvantages.

(7) Explain the principles of Bourdon gauge and draw the diagrams of various types of bourdon tubes.

(8) Explain the principles of Bellow gauge with necessary diagram and discuss its applications.