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SEAT No. _____

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SARDAR PATEL UNIVERSITY

B.Sc. Fifth semester

Instrumentation (Vocational)

US05CINV01

Process Measurement Techniques-1

Monday, 11/11/2019

Time: - 10:00 AM To 1:00 PM

Marks: - 70

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

- (1) What is the principle of operation of Bi metallic strip type thermometer?
(a) Thermal electricity. (c) Thermal conductivity.
(b) Thermal expansion. (d) Thermal radiation.
- (2) What is the Freezing point of the distilled water?
(a) 212 °F (c) 32 °F
(b) -17.7 °F (d) 273 °F
- (3) What is the response time of the filled system thermometer?
(a) Small. (c) Large.
(b) Zero. (d) Nearly zero.
- (4) Which parameter is increased when Thermocouples are connected in series?
(a) Sensitivity. (c) Accuracy.
(b) Reproducibility. (d) Repeatability.
- (5) Which method is best suited for measurement of temperature of moving object?
(a) Total radiation pyrometer. (c) Thermocouple thermometers.
(b) Filled system thermometers. (d) RTD thermometers.
- (6) What is the temperature coefficient of Thermistor?
(a) Positive. (c) Negative.
(b) Zero. (d) None of above.
- (7) What is the atmospheric pressure at sea level?
(a) 1.0332 Kg/cm. (c) 1.00 Kg/cm.
(b) 1.0 Torr. (d) 1.00 dyne/cm.
- (8) What is the principle of operation of the manometer?
(a) Electrostatic balance. (c) Hydrostatic balance.
(b) Electromagnetic balance. (d) Pneumatic balance.
- (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) Greater displacement can be obtained with _____ diaphragm.
(a) Dish. (c) Flat.
(b) Corrugated. (d) Capsules.

Q2 Answer the following questions (Any Ten) (20)

- (1) What is the temperature of the saturated steam in °C, °F, °R and °K units?
- (2) With the typical range of operation, give the name of the liquids that can be used in liquid in glass thermometer.
- (3) List the advantages and disadvantages of the Bi Metallic strip thermometer.
- (4) Discuss the laws of thermocouples in details.
- (5) Write the expression relating the emf produced and the temperature of the thermocouple at hot junction.
- (6) Write a note on series and parallel connection of thermocouples?
- (7) Calculate the pressure exerted at the bottom of the water tank filled to 1.5 meter level, The area of the tank is 1 square meter.
- (8) Explain why the Inclined U tube manometer has higher sensitivity.
- (9) Define Atmospheric and Absolute pressure.
- (10) List the characteristics features required in materials used to prepare the Diaphragm.
- (11) List the advantages and disadvantages of the bourdon gauge.
- (12) Briefly explain What is thermal conductivity?

Q3 Describe the physical quantity temp. List and discuss the various measurement scales (units) used for the temperature measurement (10)

OR

Q3 Write a note on filled system thermometer. List their advantages and disadvantages. (10)

Q4 Give the constructional details of Thermistors and explain its working, also list advantages and disadvantages of thermistor sensors. (10)

OR

Q4 Describe the Peltier effect and Thomson effect for Thermoelectricity (10) and also discuss various laws of thermocouple.

Q5 Discuss various terms used in the pressure measurements and explain the method for the measurement of atmospheric pressure. (10)

OR

Q5 Explain how the limitation of Piezo meter can be overcome by the U-tube manometer. Explain the working of U tube manometers briefly. (10)

Q6 Explain the principles of Bourdon gauge and draw the diagrams of various types of bourdon gauge. (10)

OR

Q6 Explain working principle and construction of Pirani gauge. (10)