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SARDAR PATEL UNIVERSITY

B.Sc. Fifth semester

Instrumentation (Vocational)

US05CINV01

Process Measurement Techniques-1

Tuesday, 12/11/2013

Time: - 10:30 To 1:30 PM

Marks: - 70

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

- (1) Which instrument is not suitable for direct temperature recording?
(a) Liquid in glass thermometers. (c) Thermocouple thermometers.
(b) Filled system thermometers. (d) RTD thermometers.
- (2) What is the response time of the filled system thermometer?
(a) Small. (c) Large.
(b) Zero. (d) Nearly zero.
- (3) Cross temperature compensation is best obtained in _____
(a) Gas filled thermometer. (c) Vapor filled thermometer.
(b) Liquid filled thermometer. (d) Dual filled thermometer.
- (4) Series connection of Thermocouples provides high _____
(a) Sensitivity. (c) Accuracy.
(b) Reproducibility. (d) Repeatability.
- (5) Which method is best suited for measurement of temperature of moving object?
(a) Optical 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 operating principle of manometers?
(a) Electrostatic balance. (c) Hydrostatic balance.
(b) Electromagnetic balance. (d) Pneumatic balance.
- (8) Which manometer is used to measure the flow of heavy liquids?
(a) Inclined U tube. (c) U tube.
(b) Piezo meter. (d) Inverted U tube.
- (9) What is the atmospheric pressure at sea level?
(a) 1.0332 Kg/cm² (c) 1.00
(b) 1.0 Torr. (d) 1.00 dyne/cm.
- (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 and °K units?
- (2) Explain why the vapor filled thermometers are better than liquid filled.
- (3) With the typical range of operation, give the name of the liquids that can be used in liquid in glass thermometer.
- (4) Discuss the See back's experiment of the thermoelectricity.
- (5) List the advantages and disadvantages of Thermistor over the RTD sensors.
- (6) What is thermo pile? Draw the schematic and explain it.
- (7) Differentiate Atmospheric and Absolute pressure.
- (8) List the limitations of the Piezo meter and explain how they can be overcome by using U tube manometer.
- (9) Explain the practical setup used to measure the atmospheric pressure.
- (10) List the advantages and disadvantages of the bourdon gauge.
- (11) Explain how the operational error of bourdon gauge can be reduced.
- (12) What is thermal conductivity?

Q3 With necessary circuits explain the principles of working of bi-metallic thermometer. (10)

OR

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

Q4 Give the constructional detail of RTD probes and explain the working of RTD sensors. (10)

OR

Q4 What are the Optical Pyrometers and explain their working principles and discuss their construction. (10)

Q5 Define Pressure and explain working of Single Column Manometer. (10)

OR

Q5 Write a note on single column expanded bulb manometers. (10)

Q6 Explain the principles of operation of diaphragm pressure gauge and draw the diagram of the various types of diaphragms. (10)

OR

Q6 Explain how the principle of thermal conductivity can be used to measure the pressure. Explain working of Pirani gauge briefly. (10)

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