

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-IV(New) EXAMINATION – SUMMER 2016

Subject Code:2141705**Date:03/06/2016****Subject Name:Industrial Measurement I****Time:10:30 AM to 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

MARKS**Q.1****Short Questions****14**

- 1 Give Comparison of accuracy and precision with example.
- 2 _____ order system has excellent fidelity.
- 3 Enlist the selection factors of transducers.
- 4 Give the difference between primary and secondary transducer with example
- 5 A pressure gauge used to measure vacuum indicates a gauge pressure of 5 kPa. If the atmospheric pressure is 100 kPa, the absolute pressure is _____
- 6 The inclined tube manometer is used to _____
- 7 In pressure, 1 atm = _____ mmWg = _____ torr
- 8 Determine the height of liquid column in a closed tank. The hydrostatic pressure is given as 1.6 kg/cm^2 and the external pressure on liquid the tank is 0.5 kg/cm^2 . Density of water = 1000 kg/m^3 .
- 9 A thermocouple with its reference junction exposed to room temperature of 20°C gives an open circuit voltage of 5mV. If the thermocouple has temperature sensitivity of $50 \mu\text{V}/^\circ\text{C}$, the measured temperature is _____
- 10 What do you mean by PT100?
- 11 Define “turn-down” in case of flowmeter.
- 12 Define vena contracta point.
- 13 Which type of thermocouple has the highest sensitivity?
- 14 The temperature range of J-type thermocouple is _____

Q.2 (a) What are the possible sources of errors in filled system thermometer?**03**

	How are they minimized?	
	(b) Discuss capacitance type level measurement.	04
	(c) Explain the basic principle of RTD. Draw and discuss all the measurement circuitry for temperature measurement using RTD.	07
	OR	
	(c) Discuss the basic principle of piezoelectric transducer. Explain its application for the pressure measurement.	07
Q.3	(a) Draw the arrangement to measure gauge pressure and absolute pressure with the help of bellows pressure gauge, by utilizing force and motion balance arrangement.	03
	(b) Discuss the basic principle of manometer. Explain barometer and ring-balance type manometer.	04
	(c) Explain the dead weight tester with its basic principle of operation.	07
	OR	
Q.3	(a) Give the difference between hot-cathode ionization gauge and cold-cathode ionization gauge.	03
	(b) Discuss the relationship between range and sensitivity of manometer. Enlist the ideal properties of manometric fluid.	04
	(c) Why is McLeod gauge considered to be a standard for measurement of pressure in the vacuum range? Explain the construction of McLeod gauge with basic principle of operation.	07
Q.4	(a) Explain the method of level measurement in an open-to-atmosphere tank using differential pressure transmitter.	03
	(b) What are thermistors? How are they constructed? Draw and discuss their resistance-temperature characteristic.	04
	(c) A displacer with area of cross section 5 cm^2 , length 8m and specific gravity 6 is used for measuring water level in a tank of maximum level 8 meters. The displacer is weighed with a spring balance directly. Assume density of water is 1000 kg/m^3 .	07
	i. Find out the levels when the spring balance reads 23, 22 and 21kgs.	
	ii. What does the spring balance read when the tank is full.	
	OR	
Q.4	(a) Explain the basic principle of non-contact type level indicator.	03
	(b) Describe the operating principle of radiation pyrometer for measurement of temperature.	04
	(c) Describe with a neat sketch the working of an Air Purge method of level measurement system	07
Q.5	(a) What is Reynolds number? What is its role in flow calculations? How are laminar and turbulent flows distinguished by the Reynolds number?	03
	(b) Discuss the principle and construction of orifice plate flowmeter.	04
	(c) Describe the construction and working of turbine flowmeters. Also discuss how the output is obtained in digital form for both flow rate and total flow.	07
	OR	
Q.5	(a) Explain the difference between volume flow rate and mass flow rate.	03
	(b) Explain working principle of electromagnetic flowmeter.	04
	(c) Explain the working principle of vortex flowmeter. Enlist its advantages over other methods.	07
