Seat No.: _____ Enrolment No._____

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 μV/^{o}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 1000kg/m^3. 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.	**07**

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**

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