Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME Semester –III Examination Dec. - 2011

Subject code: 731001 **Date: 05/12/2011**

Subject Name: Low Temperature Measurement and Instrumentation

Time: 10.30 am – 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.**

Q.1	**(a)**	Explain the functional stages of measuring systems with a line diagram. Explain clearly the difference between (i) Accuracy and Precision (ii) Span and Range (iii) Dead zone and Dead time with neat free sketches	**07**
	(b)	List out the all various types of thermometers and explain working principle of resistance type thermometer and vapour pressure thermometer with neat sketch	**07**
Q.2	**(a)**	Explain step response of the second order under damped systems. Draw a sketch of response for various damping ratio ζ. What should be the ideal range of ζ for good control system? Explain why?	**07**
	(b)	Enlist the various types of sensors and transducers. Explain (1) capacitive transducers (2) piezoelectric transducer sensors with neat sketches.	**07**
		OR	
	(b)	What are the selection criteria for instrument transducers? Write a short note on LVDT with neat sketch stating clearly merits and demerits.	**07**
Q.3	**(a)**	Give detail Classification of flow measuring instruments. Write a note on flow visualization with a neat sketch.	**07**
	(b)	Explain calibration of level measuring instruments. Explain how the capacitance level sensor is used for level measurement with neat sketch?	**07**
		OR	
Q.3	**(a)**	What are variable area flow meters? Explain (i) ultrasonic flow meter. (ii) Electromagnetic flow meters.	**07**
	(b)	Explain working of hot wire anemometer with neat sketch and advantages and disadvantages.	**07**
Q.4	**(a)**	Explain (1) McLeod Gauge (2) Knudsen gauge for vacuum measurement.	**07**
	(b)	Enlist various techniques for sound measurement. Explain how the sound is measured with microphones. Also write a note on capacitor microphone.	**07**
		OR	
Q.4	**(a)**	Explain working of (1) piezoelectric pressure transducer (2) strain gauge type pressure transducer with neat sketches.	**07**
	(b)	State various methods used for density measurement write a note on density measurement by differential pressure (D/p) transmitter methods.	**07**

Continue…

Q.5	**(a)**	Explain (i) ^{3}He melting curve thermometer (ii) Infrared thermometer with neat sketch.	**07**
	(b)	Write a short note on radiography as a non- destructive testing method.	**07**

OR

Q.5	**(a)**	How the calibration of thermometer is done? Explain errors and precautions in temperature measurement.	**07**
	(b)	Explain ultrasonic techniques used for non destructive testing.	**07**

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