

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – III • EXAMINATION – WINTER • 2014

Subject code: 731001**Date: 25-11-2014****Subject Name: Low Temperature Measurement and Instrumentation****Time: 02:30 pm - 05:00 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 in brief about Significance of measurement. **07**
 Explain in detail about Fundamental stages of measuring systems.
- (b)** Define the following: **07**
 1. Static Characteristics 2. Accuracy 3. Sensitivity 4. Reproducibility
 5. Drift 6. Precision 7. Dead Zone
- Q.2 (a)** List down the types of Errors that can occur during measurement. **07**
 Discuss in detail about Systematic errors in measurement.
- (b)** What do you mean by Transducers? Explain in detail about concept and Advantages of Electric transducers. **07**
- OR**
- (b)** Discuss in detail about Classification of Transducers. **07**
- Q.3 (a)** Discuss in detail about Piezo electric Transducer for Pressure measurement. Also state its Advantages and Dis-Advantages **07**
- (b)** List down the techniques for vacuum measurements. **07**
 Discuss in detail about McLeod gauge for vacuum measurements.
- OR**
- Q.3 (a)** List down the techniques for density measurements. **07**
 Explain in detail about Density measurement through differential Pressure method.
- (b)** 1) A Liquid Hydrogen storage vessel having Inner diameter is 1.80 m, the Hydrostatic pressure indication is 0.855 kPa. If the fluid pressure in the Ulage space is 101.3 kPa. Determine the liquid Level in the vessel. **07**
 Take saturated vapour density $\rho_g = 1.331 \text{ kg/m}^3$
 Conversion factor $g_c = 1$ and $g = 9.8 \text{ m/s}^2$
 Liquid density $\rho_l = 70.79 \text{ kg/m}^3$
- 2) Draw only the neat sketch of Hydrostatic liquid Level gauge.
- Q.4 (a)** Explain in detail about Sound measurement technique using Microphones. **07**
- (b)** What do you mean by Non-destructive Testing? **07**
 Discuss in detail about Radiography technique for Non-destructive Testing.
- OR**
- Q.4 (a)** Explain in detail about: 1. Turbine Flow meter 2. Pitot static tube **07**
- (b)** List down the techniques for Cryogenic Liquid Level measurements. **07**
 Explain in detail about Movable Electric Resistance Liquid Level gauge.
- Q.5 (a)** 1) Define the following: 1. Noise and Signal 2. Phase Noise and Amplitude Noise **07**
 2) Describe in brief about Electric noise measurement techniques.
- (b)** Discuss in detail about Vapour Pressure thermometers. **07**
 Also Discuss the equation of sensitivity for this thermometer.
- OR**
- Q.5 (a)** List down the techniques for flow measurements. Explain in detail about Ultrasonic **07**

Flow meter

- (b)** List down the Types of Strain gauges: Explain in detail about Bonded wire strain gauge. **07**