National Institute of Technology, Delhi

Name of the Examination: B. Tech.

Branch	: ECE	**Semester**	: IV
Title of the Course	: Electronics Measurement and Instrumentation	**Course Code**	: ECB 254

Time: 2 Hours **Maximum Marks: 25**

Note : All questions are compulsory.

Q1. Discuss about the static characteristics of instruments in detail. **[5 Marks]**

Q2. (a) A 0-200V voltmeter has a guaranteed accuracy of 1.5 percentage of full scale **[4 Marks]** reading. The voltage measured by this instrument is 60V. Calculate the limiting error in percentage.

(b) Find the dynamic range of the instrument if the instrument has a range of [3V, 30V] with resolution of 1.5mV.

Q3. What is transducer? Give the Classification, advantage and disadvantages of electrical **[5 Marks]** transducers with suitable examples.

Q4. Explain how LVDT can be used for pressure measurement with suitable diagram. **[3 Marks]**

Q5. What is Strain Gauge? On what principle it works? Derive an expression for the gauge **[3 Marks]** factor.

Q6. A resistance wire strain gauge with a gauge factor of 1.5 is bonded to a steel structural **[2 Marks]** member subjected to stress of 45 MN/m^2. The modulus of elasticity of steel is 50 GN/m^2. Calculate the percentage change in the value of the gauge resistance due to the applied stress.

Q7. 15N force acting on a piezoelectric crystal having dimension of 5mm X 5mm X **[3 Marks]** 1.25mm. If the charge sensitivity of crystal is 150pC/N and its permittivity is 12.5×10^{-9} F/m. If the modulus of elasticity of crystal is 12×10^6 N/m^2, calculate strain, charge and capacitance.