COLLEGE OF ENGINEERING & TECHNOLOGY

Department: Electrical & Computer Control Engineering
Lecturer : Staff **Marks: 40**
Course : Instrumentation & Measurements. **Time : 2 hours**
Course Code: EE - 218 11^{30} to 13^{30} **Date : 25 /5/ 2015**

ANSWER THE FOLLOWING QUESTIONS:

Main specifications: ..... ***8 marks***

1- a) Explain briefly with figures:
i – The difference between sensor and transducer.
ii – The standard signals (current signals and pneumatic signals).

b) Define the followings: **Range, Resolution, Sensitivity and Accuracy.**

c) If the readings of an unknown coil inductance L were:
20, 19, 21, 18 and 22 Henry, determine the following:
i – Mean value.
ii – Standard deviation for measurement.
iii – The actual value of the coil.

Pressure & Level ..... ***8 marks***

2– Explain with a sketch the operational function of the following devices:

a) Linear Variable Differential Transformer ***LVDT***.

b) Whessoe Tank gauge for level measurement.

c) Derive the basic relation that governs the operation of the wire strain gauge.

$$\Delta R / R_0 = 2 (\Delta L / L_0)$$

d) In a square electrodes $5 \times 5\ m^2$ capacitance level gauge if the separation distance between the two electrodes *is 5 cm*. When the tank is **partially** filled the capacitance C is *2200 pf*. Find the height of the liquid in the tank.

Given that:

Liquid constant $K = 0.7$, air constant $K = 1$ and $\varepsilon_0 = 8.85\ pf/m$.

Members of course Examination Committee:	Signature:	Date:
Lecturer: Dr. Abdelaal Asran		10/5/2015
Course Coordinator : Dr. Ahmed El Shenawy		10/5/2015
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