King Abdulaziz University
Faculty of Engineering
Mechanical Engineering

MEP 365
Thermal Measurements
Fall 2022
HW. # 01 on Ch. 1

1-List the main stages of the measurement system. Draw a sketch showing the relations between the stages?

2-Define each of the followings:
- discrete and continuous variables
- extraneous variables
- dependent and independent variables
- interference and noise
- random test
- replication and repetition
- input (r_i) and output (r_o) range

3-What are the effects that extraneous variables introduce into the measured variables?

4-Define calibration? and static sensitivity K

5-How a parameter is different than a variable?

6-Which is more important to eliminate: interference or noise and why?

7-How to eliminate or minimize interference?

8-List the steps of the experimental test plan. What are the typical questions that have to be answered in each step?

9-Define static and dynamic calibration, and what is the difference between the two?

10-What is meant by Full Scale Operating range (FSO)?

11-What is a random block? Give an example?

12-Define random (precision) error, systematic (bias) error, and accuracy? Draw a sketch.

13-Define absolute error and percent accuracy?

14-A force measurement system has the following specifications:

Range	0-1000N
Linearity error	0.15 % FSO
Hysteresis error	0.20 % FSO
Sensitivity error	0.7 % reading
Zero drift	0.2 % FSO

Calculate the uncertainty if the reading is around **950 N**.

15-Problem 1.54 in your textbook (Figliola 6th edition) with the following values instead of Table 1.5 values

X [mm]	0.5	1.0	2.0	5.0	10.0	20.0	50.0	100.0
Y[V]	0.4	1.0	**2.5**	6.9	15.8	35.0	110.1	**265.0**

16-Problem No. 1.56 in your textbook (Figliola, 6th edition)
17- Problem No. 1.46 in your textbook (Figliola, 6th edition)