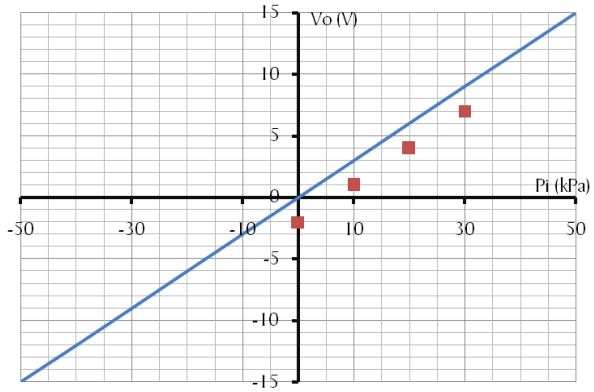
Multiple Choice Samples



The sensitivity of a pressure measuring instrument has the following calibration curve is:

a. 0.3 mV/kPa b. 0.3 V/kPa c. 1 V/kPa d. -0.3 V/kPa

If the same instrument is used to measure an input pressure of (60 kPa) the output voltage will be:

a. 18 mV b. 60 V c. -18 V d. 18 V

If the same instrument was used to measure pressure values of (0,10 , 20 ,and 30 kPa) at a different location and gave the results shown in figure (square markers). The error shown represents :

a. A (2V) Zero Drift b. A (2V) Sensitivity Drift
c. A (-2V) Zero Drift d. A (-2V) Sensitivity Drift

Suppose that we have a weight measuring instrument that consists of a spring whose deflection is proportional to the measured weight, gear system that converts the linear deflection of the spring to a rotational displacement, and pointer that displays the weight value. The detector-transducer stage is the

(a) spring (b) gear system (c) pointer (d) spring, gear system and pointer

The following information is for questions 1,2. A first order measurement system is described by the differential equation $3\frac{dx}{dt} + 6x = 15,\ x(0) = 0$

1. The time constant is equal to

(a)0.5 (b) 1.5 (c)2 (d)2.5

2. The system will display the following value for x

(a)0.67 (b)2.5 (c) (d)15

A known temperature value of 36 ^{o}C is measured. The following temperature measurements in ^{o}C are taken with a temperature measuring device

$T_1 = 33, T_2 = 37, T_3 = 36, T_4 = 34, T_5 = 35, T_6 = 34, T_7 = 35, T_8 = 33$

(a) Find the mean and standard deviation for the measurements.

(b) Find the accuracy and precision of the temperature measuring device.

(c) The density of air is to be determined by the relation $p = \rho RT$. The value of R for air is 287.1 J/kg-K and may be assumed exact. The temperature and pressure are measured as

$T = 60 \pm 0.5\ ^{\circ}\text{C}$

$p = 130 \pm 0.7\ \text{KPa}$

Calculate the value of density in kg/m^3 and its uncertainty.
