EE4904
Biomedical Instrumentation
Tutorial 1

Question 1: Are the following numbers equal within the expected range of values?

(1) (3.42 $\pm$ 0.04) volts and 3.48 volts?

(2) (13.106 $\pm$ 0.014) uM and 13.206 uM?

(3) (2.95 $\pm$ 0.03) x m/s and 3.00 x m/s

Question 2: How many significant figures are there in each of the following?

(1) 0.00042

(2) 0.14700

(3) 4.2×10^{6}

(4) -154.090×10^{-27}

Question 3: A spirometer is shown in Figure below. What can it measure? Show the working principles of measurement.

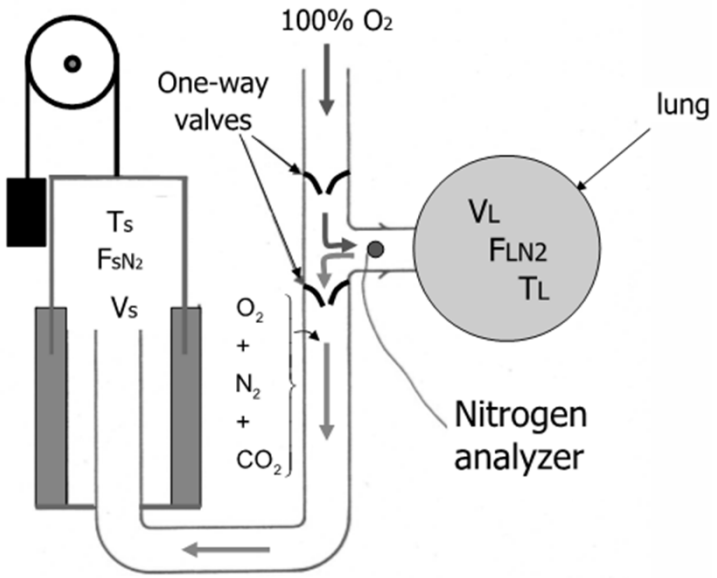

Figure. V_L lung volume; F_{LN2} nitrogen molar fraction in lung; T_L lung temperature (in K); T_S spirometer temperature (in K); V_S Spirometer volume; F_{sN2} nitrogen molar fraction in spirometer.

Question 4: A N_2-washout experiment is carried out

At beginning,

$V_s(t_1)=7$ liters, $F_{sN_2}(t_1)=0$

At the end

$V_s(t_2)=12$ liters, $F_{sN_2}(t_2)=0.026$ $T_S = 303$ K

and fraction of N_2 for the patient has decreased by 0.1.

What is the lung volume at which the patient is breathing ?