

RESPIRATION CALCULATIONSⁱ

Assume the values given below were obtained from measurements made on a healthy human at sea level.

F_{ECO_2} : 0.037	F_{IO_2} : 0.2094
F_{ACO_2} : 0.054 F_{EO_2} : 0.1737	F_{ICO_2} : 0.00 F_{AO_2} : 0.1557
$P_{(total)}$: 760 mm Hg	pK_a (carbonic acid bicarb system): 6.10
P_{AH_2O} : 47 mm	Systemic arterial plasma pH : 7.40
\dot{V}_E : $\frac{6 \text{ liters}}{\text{min}}$	α_{CO_2} : $\frac{0.03 \text{ mM}}{\text{L} \cdot \text{mmHg}}$
R : 0.85	f : $\frac{12 \text{ breaths}}{\text{min}}$

ESTIMATE:

(a) \dot{V}_{CO_2}

(b) \dot{V}_{O_2}

(c) \dot{V}_A

(d) \dot{V}_D

(e) V_D

(f) P_{ACO_2}

(g) systemic arterial $[HCO_3^-]$

(h) P_{AO_2}

(i) P_{AN_2}

(j) F_{ACO_2} IF \dot{V}_A doubles and \dot{V}_{CO_2} stays the same as above

(k) F_{ACO_2} IF breathing frequency doubles but \dot{V}_E and \dot{V}_{CO_2} stay the same as above

(l) F_{ACO_2} IF both \dot{V}_A and \dot{V}_{CO_2} double

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