

Attribution: University of Michigan Medical School, Department of Internal Medicine

License: Unless otherwise noted, this material is made available under the terms of the **Creative Commons Attribution–Noncommercial–Share Alike 3.0 License:**
<http://creativecommons.org/licenses/by-nc-sa/3.0/>

We have reviewed this material in accordance with U.S. Copyright Law **and have tried to maximize your ability to use, share, and adapt it.** The citation key on the following slide provides information about how you may share and adapt this material.

Copyright holders of content included in this material should contact open.michigan@umich.edu with any questions, corrections, or clarification regarding the use of content.

For more information about **how to cite** these materials visit <http://open.umich.edu/education/about/terms-of-use>.

Any **medical information** in this material is intended to inform and educate and is **not a tool for self-diagnosis** or a replacement for medical evaluation, advice, diagnosis or treatment by a healthcare professional. Please speak to your physician if you have questions about your medical condition.

Viewer discretion is advised: Some medical content is graphic and may not be suitable for all viewers.

Citation Key

for more information see: <http://open.umich.edu/wiki/CitationPolicy>

Use + Share + Adapt

{ Content the copyright holder, author, or law permits you to use, share and adapt. }

 **Public Domain – Government:** Works that are produced by the U.S. Government. (17 USC § 105)

 **Public Domain – Expired:** Works that are no longer protected due to an expired copyright term.

 **Public Domain – Self Dedicated:** Works that a copyright holder has dedicated to the public domain.

 **Creative Commons – Zero Waiver**

 **Creative Commons – Attribution License**

 **Creative Commons – Attribution Share Alike License**

 **Creative Commons – Attribution Noncommercial License**

 **Creative Commons – Attribution Noncommercial Share Alike License**

 **GNU – Free Documentation License**

Make Your Own Assessment

{ Content Open.Michigan believes can be used, shared, and adapted because it is ineligible for copyright. }

 **Public Domain – Ineligible:** Works that are ineligible for copyright protection in the U.S. (17 USC § 102(b))
*laws in your jurisdiction may differ

{ Content Open.Michigan has used under a Fair Use determination. }

 **Fair Use:** Use of works that is determined to be Fair consistent with the U.S. Copyright Act. (17 USC § 107) *laws in your jurisdiction may differ

Our determination **DOES NOT** mean that all uses of this 3rd-party content are Fair Uses and we **DO NOT** guarantee that your use of the content is Fair.

To use this content you should **do your own independent analysis** to determine whether or not your use will be Fair.

Case V

TABLE 1. Conversion of H^+ ion concentrations (nmol/L) into pH in the physiologic and pathophysiologic ranges

pH	H^+
7.8	16
7.7	20
7.6	26
7.5	32
7.4	40
7.3	50
7.2	63
7.1	80
7.0	100
6.9	125
6.8	160

pH **7.7**
pCO₂ **30**
HCO₃⁻ **36**
Cl⁻ **95**
Na⁺ **140**

What is the acid-base disorder?

© PD-INEL Source Undetermined

$$[H^+] = \frac{24 \times pCO_2}{HCO_3^-}$$

Normal HCO₃⁻ = 24
Normal pCO₂ = 40
Normal AG = 12 ± 4

Case VI

TABLE 1. Conversion of H^+ ion concentrations (nmol/L) into pH in the physiologic and pathophysiologic ranges

pH	H^+
7.8	16
7.7	20
7.6	26
7.5	32
7.4	40
7.3	50
7.2	63
7.1	80
7.0	100
6.9	125
6.8	160

What is the HCO_3^- if the $[H^+]$ is 40 and the pCO_2 is 20?

What is the acid-base disorder?

© PD-INEL Source Undetermined

$$[H^+] = \frac{24 \times pCO_2}{HCO_3^-}$$

Normal pH = 7.40
Normal HCO_3^- = 24
Normal pCO_2 = 40

Case VII

TABLE 1. Conversion of H⁺ ion concentrations (nmol/L) into pH in the physiologic and pathophysiologic ranges

pH	H ⁺
7.8	16
7.7	20
7.6	26
7.5	32
7.4	40
7.3	50
7.2	63
7.1	80
7.0	100
6.9	125
6.8	160

A 76 yo man with type 2 diabetes mellitus post op for AAA repair with painful RLE.

Pre-op

pH	7.42
pCO₂	38
HCO₃⁻	24
Cl⁻	106
Na⁺	140
K⁺	3.8

Post-op

pH	7.32
pCO₂	20
HCO₃⁻	10
Cl⁻	112
Na⁺	140
K⁺	5.0

© PD-INEL Source Undetermined

What is the anion gap?

What is the acid-base disorder?

$$[H^+] = \frac{24 \times pCO_2}{HCO_3^-}$$

Normal pH = 7.40
Normal HCO₃⁻ = 24
Normal pCO₂ = 40

Additional Source Information

for more information see: <http://open.umich.edu/wiki/CitationPolicy>

Slide 3: Source Undetermined

Slide 4: Source Undetermined

Slide 5: Source Undetermined