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Chemistry

Physical Acids & Bases Essential Pre-Uni Chemistry J2.4

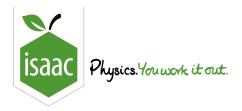
# Essential Pre-Uni Chemistry J2.4



Calculate the pH of a $0.012\mathrm{moldm^{-3}}$ solution of HCl.  Part B (b)  Calculate the pH of a $0.030\mathrm{moldm^{-3}}$ solution of sulfuric acid. (For the purpose of this question, assume that sulfuric acid dissociates fully.)	Part A (a)
Calculate the $pH$ of a $0.030\mathrm{moldm^{-3}}$ solution of sulfuric acid. (For the purpose of this question, assume that sulfuric acid dissociates fully.)	Calculate the $ m pH$ of a $0.012 m moldm^{-3}$ solution of $HCl$ .
Part C (c)	Calculate the $pH$ of a $0.030\mathrm{moldm^{-3}}$ solution of sulfuric acid. (For the purpose of this
Calculate the concentration of a solution of nitric acid with $\mathrm{pH}=2.1$ .	

#### Part D (d)

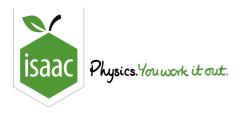
Calculate the concentration of a solution of sulfuric acid with a pH of 4.7. (For the purpose of this question, assume that sulfuric acid dissociates fully.)



# Essential Pre-Uni Chemistry J2.5



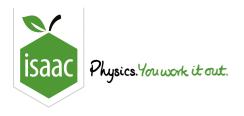
Part A (a)		
Calculate the concentration of a solution of barium hydroxide with a $pH$ of $9.5.$		
Part B (b)		
Calculate the $pH$ of a $0.0800\mathrm{moldm^{-3}}$ solution of $KOH.$		



### Essential Pre-Uni Chemistry J2.9



 $50.0\,\mathrm{cm^3}$  of a solution of  $0.200\,\mathrm{mol\,dm^{-3}}$  nitric acid is mixed with  $200\,\mathrm{cm^3}$  of a solution of  $0.160\,\mathrm{mol\,dm^{-3}}$  potassium hydroxide. Calculate the pH of the resulting mixture.



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Chemistry

Physical Acids & Bases Essential Pre-Uni Chemistry J3.2

## Essential Pre-Uni Chemistry J3.2



Species	$K_{\sf a}/{ m moldm^{-3}}$
Benzoic acid	$6.3 imes10^{-5}$
Hydrogen sulfide	$8.9  imes 10^{-8}$
Iron(III)	$6.0 imes10^{-3}$
Methanoic acid	$1.6 imes10^{-4}$
Sulfuric(IV) acid	$1.5 imes10^{-2}$
Boric acid	$5.8 imes10^{-10}$

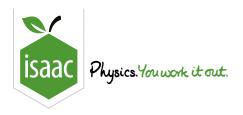
Calculate the concentration of a solution of benzoic acid with a pH of 3.2.



## Essential Pre-Uni Chemistry J3.6



Calculate the  $K_{\rm a}$  of an acid, HA, with a pH of 5.0 when its concentration is  $0.20\,{\rm mol\,dm^{-3}}$ .

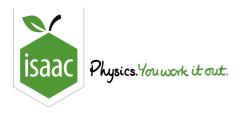


### Essential Pre-Uni Chemistry J3.9



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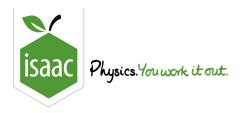
Sulfur dioxide dissolves in water to give sulfuric(IV) acid:  $SO_2\left(g\right) + H_2O\left(l\right) \Longrightarrow H_2SO_3\left(aq\right)$ . Calculate the RTP volume of sulfur dioxide required to reduce the pH of a lake of volume  $0.40\,\mathrm{km}^3$  from 7.0 to 6.0.



### Essential Pre-Uni Chemistry J5.2



Propanoic acid has a  $pK_a$  value of 4.9 and is highly soluble in water. If  $200\,\mathrm{cm^3}$  of propanoic acid solution at  $2.0\,\mathrm{mol\,dm^{-3}}$  is treated with  $800\,\mathrm{cm^3}$  of potassium propanoate solution at  $1.0\,\mathrm{mol\,dm^{-3}}$ , give the pH of the resulting buffer.



### Essential Pre-Uni Chemistry J5.4



#### Part A (a)

Given that methanoic acid has a  $K_{\rm a}$  of  $1.6 \times 10^{-4}\,{\rm mol\,dm^{-3}}$ , calculate the  ${\rm pH}$  of a solution containing  $25\,{\rm mmol}$  of methanoic acid and  $40\,{\rm mmol}$  of potassium methanoate.

#### Part B (b)

Given that methanoic acid has a  $K_{\rm a}$  of  $1.6 \times 10^{-4}\,{\rm mol\,dm^{-3}}$ , calculate the  ${\rm pH}$  of a solution containing  $0.40\,{\rm mol}$  of methanoic acid and  $0.32\,{\rm mol}$  of magnesium methanoate.



### Essential Pre-Uni Chemistry J5.5

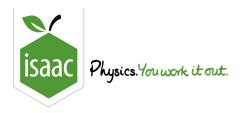


#### Part A (a)

Given that methanoic acid has a  $K_{\rm a}$  of  $1.6 \times 10^{-4} \, {\rm mol \, dm^{-3}}$ , calculate the pH obtained when  $100 \, {\rm cm^3}$  of  $0.25 \, {\rm mol \, dm^{-3}}$  methanoic acid is treated with  $10 \, {\rm cm^3}$  of  $0.50 \, {\rm mol \, dm^{-3}}$  sodium hydroxide.

#### Part B (b)

Given that methanoic acid has a  $K_{\rm a}$  of  $1.6 \times 10^{-4} \, {\rm mol \, dm^{-3}}$ , calculate the pH of the solution obtained when  $1.7 \, {\rm g}$  of sodium methanoate is dissolved in  $40 \, {\rm cm^3}$  of  $0.10 \, {\rm mol \, dm^{-3}}$  hydrochloric acid.



### Essential Pre-Uni Chemistry J5.10



A buffer of pH 7.8 is prepared by taking  $200\,\mathrm{cm^3}$  of  $0.020\,\mathrm{mol\,dm^{-3}}$  "tris" solution and adding dilute hydrochloric acid from a burette until the pH is correct. If this requires  $1.35\,\mathrm{cm^3}$  of  $2.0\,\mathrm{mol\,dm^{-3}}$  HCl(aq), calculate the  $pK_a$  of "tris".