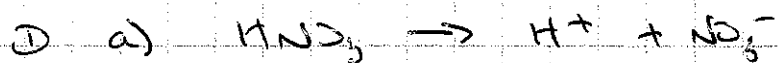


Strong Acids



$$[\text{H}^+] = [\text{HNO}_3] = \boxed{0.3 \text{ mol/L}}$$

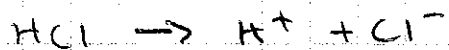
b) $K_w = [\text{H}^+][\text{OH}^-]$

$$1 \times 10^{-14} = 0.3 [\text{OH}^-]$$

$$[\text{OH}^-] = \boxed{3.3 \times 10^{-14} \text{ mol/L}}$$

② $\text{HCl} \quad \frac{0.37 \text{ g}}{36.5 \text{ g/mol}} = 0.010 \text{ mol}$

$$\frac{0.010 \text{ mol}}{0.25 \text{ L}} = 0.041 \text{ mol/L}$$



$$[\text{H}^+] = [\text{HCl}] = 0.041 \text{ mol/L}$$

$$K_w = [\text{H}^+][\text{OH}^-]$$

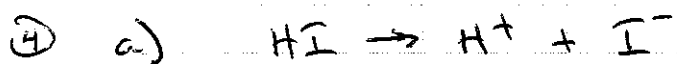
$$1 \times 10^{-14} = 0.041 [\text{OH}^-]$$

$$[\text{OH}^-] = \boxed{2.5 \times 10^{-13} \text{ mol/L}}$$

③ $K_w = [\text{H}^+][\text{OH}^-]$

$$1 \times 10^{-14} = 4.4 \times 10^{-3} [\text{OH}^-]$$

$$[\text{OH}^-] = \boxed{2.3 \times 10^{-12} \text{ mol/L}}$$



$$[\text{H}^+] = [\text{HI}] = 0.006 \text{ mol/L}$$

$$\text{pH} = -\log(0.006) = \boxed{2.22}$$

$$\text{pOH} = 14 - \text{pH}$$

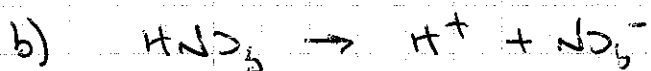
$$= 14 - 2.22$$

$$\text{pOH} = \boxed{11.78}$$

$$[\text{OH}^-] = 10^{-\text{pOH}}$$

$$= 10^{-11.78}$$

$$[\text{OH}^-] = \boxed{1.7 \times 10^{-12} \text{ mol/L}}$$



$$[\text{H}^+] = [\text{HNO}_3] = 0.025 \text{ mol/L}$$

$$\text{pH} = -\log(0.025) = \boxed{1.60}$$

$$\text{pOH} = 14 - \text{pH}$$

$$= 14 - 1.60$$

$$\text{pOH} = \boxed{12.40}$$

$$[\text{OH}^-] = 10^{-12.40}$$

$$[\text{OH}^-] = \boxed{4.0 \times 10^{-13} \text{ mol/L}}$$



$$[\text{H}^+] = [\text{HCl}] = 0.010 \text{ mol/L}$$

$$\text{pH} = -\log(0.010) = \boxed{2}$$

$$\text{pOH} = 14 - \text{pH}$$

$$= 14 - 2$$

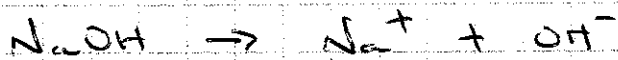
$$\text{pOH} = \boxed{12}$$

$$[\text{OH}^-] = 10^{-12}$$

$$= \boxed{1 \times 10^{-12} \text{ mol/L}}$$

$$\textcircled{5} \text{ NaOH} \quad \frac{26 \text{ g}}{40 \text{ g/mol}} = 0.65 \text{ mol}$$

$$\frac{0.65 \text{ mol}}{0.15 \text{ L}} = 4.333 \text{ mol/L}$$



$$[\text{OH}^-] = [\text{NaOH}] = 4.333 \text{ mol/L}$$

$$\text{pOH} = -\log(4.333) = \boxed{-0.64}$$

$$\text{pH} = 14 - \text{pOH}$$

$$= 14 - (-0.64)$$

$$\text{pH} = \boxed{14.64}$$

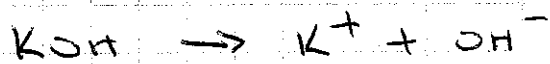
6

$$\text{pH} = 11.5$$

$$\text{pOH} = 14 - 11.5 = 2.5$$

$$[\text{OH}^-] = 10^{-2.5}$$

$$[\text{OH}^-] = 0.0032 \text{ mol/L}$$



$$[\text{KOH}] = [\text{OH}^-] = 0.0032 \text{ mol/L}$$

$$0.0032 \text{ mol/L} \times 0.5 \text{ L} = 0.00158 \text{ mol of KOH}$$

$$0.00158 \text{ mol} \times 56.1 \text{ g/mol} = \boxed{0.089 \text{ g}} \text{ of KOH}$$

7 a) Food	$[\text{H}_3\text{O}^+]$	$[\text{OH}^-]$	pH	pOH
oranges	5.5×10^{-3}	1.8×10^{-12}	2.26	11.74
asparagus	4×10^{-9}	2.5×10^{-6}	8.4	5.6
olives	5×10^{-4}	2×10^{-11}	3.3	10.70
blackberries	4×10^{-4}	2.5×10^{-11}	3.4	10.6

b) oranges

c) asparagus - it's a base, so it will neutralize stomach acid

⑧ $[H_3O^+] = 10^{-4} = 1 \times 10^{-4} \text{ mol/L}$ before

$[H_3O^+] = 10^{-2} = 1 \times 10^{-2} \text{ mol/L}$ after

$[H_3O^+]$ after is 100 times greater.