

CHEMISTRY

CHEMICAL THERMODYNAMICS AND ENERGETICS

$$(1) \quad q = \Delta E + W$$

$$(2) \quad W = P (V_2 - V_1) \text{ joule}$$

$$(3) \quad N = \frac{\text{Weight in kg}}{\text{M.W.in kg}}$$

$$(4) \quad q = W_{\max} = 2.303 \, n \, RT \times \log \frac{V_2}{V_1} \text{ joule.}$$

$$= 2.303 \, n \, RT \log \frac{P_1}{P_2} \text{ joule}$$

$$(5) \quad \Delta H = \sum H_P - \sum H_R$$

$$(6) \quad \Delta H = \Delta E + \Delta nRT$$

$$(7) \quad \Delta H_2 = \Delta H_1 + \Delta C_p (T_2 - T_1)$$

IONIC EQUILIBRIA

$$(1) \quad K = \alpha^2 \cdot C$$

$$(2) \quad \alpha = \frac{\text{Percentage of ionisation}}{100}$$

$$(3) \quad [\text{H}^+] = a \cdot C = \sqrt{K_a \cdot C} \quad \text{mole / dm}^3$$

$$(4) \quad [\text{OH}] = a \cdot C = \sqrt{K_b \cdot C} \quad \text{mole / dm}^3$$

$$(5) \quad p^{\text{H}} = -\log_{10} [\text{H}^+] , \quad p^{\text{OH}} = -\log_{10} [\text{OH}]$$

$$(6) \quad p^{\text{H}} + p^{\text{OH}} = 14$$

$$(7) \quad K_h = h^2 \cdot C = \frac{K_w}{K_a} = \frac{K_w}{K_b}$$

$$(8) \quad K_h = \frac{h^2}{(1-h)} = h^2 = \frac{K_w}{K_a \cdot K_b}$$

$$(9) \quad \text{Molarity} = \frac{\text{kg per dm}^3}{\text{M.W. in kg}}$$

$$(10) \quad K_{sp} = S^2$$

ELECTRO CHEMISTRY

$$(1) \quad W = Z \cdot Q = Z \cdot I \cdot t$$

$$(2) \quad \frac{W_1}{W_2} = \frac{E_1}{E_2}$$

$$(3) \quad W = \frac{Q \times E}{F} = \frac{I \times t \times E}{F}$$

$$(4) \quad \text{C. E.} = E \cdot \text{C. E.} \times 96500$$

$$(5) \quad E_{\text{cell}}^0 = E_{1(\text{oxi})}^0 + E_{2(\text{red})}^0 = E_{1(\text{oxi})}^0 - E_{2(\text{oxi})}^0$$

$$(6) \quad \text{Equivalent weight} = \frac{\text{At.Wt.}}{\text{Valency}}$$

(7) One Faraday = 96500 coulombs.

NUCLEAR AND RADIOCHEMISTRY

(1) Mass defect = $[Z \times m_h + (A - Z) \times m_n] - M$ a.m.u.

(2) Mass defect = mass of reactants – mass of products.

(3) Binding energy = Mass defect \times 931 Me V

(4) Binding energy per nucleon = $\frac{\text{Mass defect} \times 931}{\text{Mass number}}$ Me V

(5) $\lambda = \frac{2.303}{t} \log \frac{N_0}{N}$ per unit time

(6) $T = \frac{0.693}{\lambda}$

PHYSICS