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## EKSAMEN DATABLAD VIR DIE FISIESE WETENSKAPPE (CHEMIE)

**TABEL 1 FISIESE KONSTANTES**

| NAAM                              | SIMBOOL    | WAARDE                                    |
|-----------------------------------|------------|-------------------------------------------|
| Grootte van lading op 'n elektron | e          | $1,6 \times 10^{-19} \text{ C}$           |
| Massa van 'n elektron             | $m_e$      | $9,1 \times 10^{-31} \text{ kg}$          |
| Standaarddruk                     | $p^\theta$ | $1,01 \times 10^5 \text{ Pa}$             |
| Molêre gasvolume by STD           | $V_m$      | $22,4 \text{ dm}^3 \cdot \text{mol}^{-1}$ |
| Standaardtemperatuur              | $T^\theta$ | $273 \text{ K (0 } ^\circ\text{C)}$       |
| Avogadro se konstante             | $N_A$      | $6,02 \times 10^{23} \text{ mol}^{-1}$    |
| Faraday se konstante              | F          | $96\,500 \text{ C} \cdot \text{mol}^{-1}$ |

**TABEL 2 CHEMIEFORMULES**

|                                                          |                                                                                                                                                 |                     |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| $n = \frac{m}{M}$                                        | $n = \frac{N}{N_A}$                                                                                                                             | $n = \frac{V}{V_m}$ |
| $c = \frac{n}{V} \quad \text{OF} \quad c = \frac{m}{MV}$ | $K_w = [\text{H}_3\text{O}^+] \cdot [\text{OH}^-] = 1 \times 10^{-14}$<br>by 25 °C (298 K)                                                      |                     |
| $\frac{c_a V_a}{c_b V_b} = \frac{n_a}{n_b}$              |                                                                                                                                                 |                     |
| $q = It$<br>$q = nF$                                     | $E_{sel}^{\theta} = E_{katode}^{\theta} - E_{anode}^{\theta}$<br>$E_{sel}^{\theta} = E_{oksideermiddel}^{\theta} - E_{reduseermiddel}^{\theta}$ |                     |

TABEL 3 PERIODIEKE TABEL

|   | 1                              | 2                              | 3                            | 4                            | 5                            | 6                            | 7                            | 8                             | 9                             | 10                            | 11                             | 12                             | 13                            | 14                             | 15                            | 16                            | 17                             | 18                     |
|---|--------------------------------|--------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|--------------------------------|-------------------------------|--------------------------------|-------------------------------|-------------------------------|--------------------------------|------------------------|
| 1 | 1<br>2,1<br><b>H</b><br>1      |                                |                              |                              |                              | Atoom-<br>getal (Z)          | 1<br>2,1<br><b>H</b><br>1    |                               | Elektro-<br>negatiwiteit      |                               |                                |                                |                               |                                |                               |                               |                                | 2<br><b>He</b><br>4    |
| 2 | 3<br>1,0<br><b>Li</b><br>7     | 4<br>1,5<br><b>Be</b><br>9     |                              |                              |                              |                              |                              |                               |                               |                               |                                |                                | 5<br>2,0<br><b>B</b><br>10,8  | 6<br>2,5<br><b>C</b><br>12     | 7<br>3,0<br><b>N</b><br>14    | 8<br>3,5<br><b>O</b><br>16    | 9<br>4,0<br><b>F</b><br>19     | 10<br><b>Ne</b><br>20  |
| 3 | 11<br>0,9<br><b>Na</b><br>23   | 12<br>1,2<br><b>Mg</b><br>24,3 |                              |                              |                              |                              |                              |                               |                               |                               |                                |                                | 13<br>1,5<br><b>Al</b><br>27  | 14<br>1,8<br><b>Si</b><br>28   | 15<br>2,1<br><b>P</b><br>31   | 16<br>2,5<br><b>S</b><br>32   | 17<br>3,0<br><b>Cl</b><br>35,5 | 18<br><b>Ar</b><br>40  |
| 4 | 19<br>0,8<br><b>K</b><br>39    | 20<br>1,0<br><b>Ca</b><br>40   | 21<br>1,3<br><b>Sc</b><br>45 | 22<br>1,5<br><b>Ti</b><br>48 | 23<br>1,6<br><b>V</b><br>51  | 24<br>1,6<br><b>Cr</b><br>52 | 25<br>1,5<br><b>Mn</b><br>55 | 26<br>1,8<br><b>Fe</b><br>56  | 27<br>1,8<br><b>Co</b><br>59  | 28<br>1,8<br><b>Ni</b><br>59  | 29<br>1,9<br><b>Cu</b><br>63,5 | 30<br>1,6<br><b>Zn</b><br>65,4 | 31<br>1,6<br><b>Ga</b><br>70  | 32<br>1,8<br><b>Ge</b><br>72,6 | 33<br>2,0<br><b>As</b><br>75  | 34<br>2,4<br><b>Se</b><br>79  | 35<br>2,8<br><b>Br</b><br>80   | 36<br><b>Kr</b><br>84  |
| 5 | 37<br>0,8<br><b>Rb</b><br>85,5 | 38<br>1,0<br><b>Sr</b><br>88   | 39<br>1,2<br><b>Y</b><br>89  | 40<br>1,4<br><b>Zr</b><br>91 | 41<br>1,6<br><b>Nb</b><br>93 | 42<br>1,8<br><b>Mo</b><br>96 | 43<br>1,9<br><b>Tc</b><br>99 | 44<br>2,2<br><b>Ru</b><br>101 | 45<br>2,2<br><b>Rh</b><br>103 | 46<br>2,2<br><b>Pd</b><br>106 | 47<br>1,9<br><b>Ag</b><br>108  | 48<br>1,7<br><b>Cd</b><br>112  | 49<br>1,7<br><b>In</b><br>115 | 50<br>1,8<br><b>Sn</b><br>119  | 51<br>1,9<br><b>Sb</b><br>121 | 52<br>2,1<br><b>Te</b><br>128 | 53<br>2,5<br><b>I</b><br>127   | 54<br><b>Xe</b><br>131 |
| 6 | 55<br><b>Cs</b><br>133         | 56<br><b>Ba</b><br>137,3       |                              | 72<br><b>Hf</b><br>178,5     | 73<br><b>Ta</b><br>181       | 74<br><b>W</b><br>184        | 75<br><b>Re</b><br>186       | 76<br><b>Os</b><br>190        | 77<br><b>Ir</b><br>192        | 78<br><b>Pt</b><br>195        | 79<br><b>Au</b><br>197         | 80<br><b>Hg</b><br>200,6       | 81<br><b>Tl</b><br>204,4      | 82<br><b>Pb</b><br>207         | 83<br><b>Bi</b><br>209        | 84<br><b>Po</b><br>–          | 85<br><b>At</b><br>–           | 86<br><b>Rn</b><br>–   |
| 7 | 87<br><b>Fr</b>                | 88<br><b>Ra</b>                |                              |                              |                              |                              |                              |                               |                               |                               |                                |                                |                               |                                |                               |                               |                                |                        |

|                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |                  |                  |                  |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|
| 57<br><b>La</b> | 58<br><b>Ce</b> | 59<br><b>Pr</b> | 60<br><b>Nd</b> | 61<br><b>Pm</b> | 62<br><b>Sm</b> | 63<br><b>Eu</b> | 64<br><b>Gd</b> | 65<br><b>Tb</b> | 66<br><b>Dy</b> | 67<br><b>Ho</b> | 68<br><b>Er</b>  | 69<br><b>Tm</b>  | 70<br><b>Yb</b>  | 71<br><b>Lu</b>  |
| 89<br><b>Ac</b> | 90<br><b>Th</b> | 91<br><b>Pa</b> | 92<br><b>U</b>  | 93<br><b>Np</b> | 94<br><b>Pu</b> | 95<br><b>Am</b> | 96<br><b>Cm</b> | 97<br><b>Bk</b> | 98<br><b>Cf</b> | 99<br><b>Es</b> | 100<br><b>Fm</b> | 101<br><b>Md</b> | 102<br><b>No</b> | 103<br><b>Lw</b> |

**TABEL 4      STANDAARDELEKTRODEPOTENSIALE**

|  | Half-reaksie                                                                                                       | $E^\theta$ / volt |  |
|--|--------------------------------------------------------------------------------------------------------------------|-------------------|--|
|  | $\text{Li}^+ + \text{e}^- \rightleftharpoons \text{Li}$                                                            | -3,05             |  |
|  | $\text{K}^+ + \text{e}^- \rightleftharpoons \text{K}$                                                              | -2,93             |  |
|  | $\text{Cs}^+ + \text{e}^- \rightleftharpoons \text{Cs}$                                                            | -2,92             |  |
|  | $\text{Ba}^{2+} + 2\text{e}^- \rightleftharpoons \text{Ba}$                                                        | -2,90             |  |
|  | $\text{Sr}^{2+} + 2\text{e}^- \rightleftharpoons \text{Sr}$                                                        | -2,89             |  |
|  | $\text{Ca}^{2+} + 2\text{e}^- \rightleftharpoons \text{Ca}$                                                        | -2,87             |  |
|  | $\text{Na}^+ + \text{e}^- \rightleftharpoons \text{Na}$                                                            | -2,71             |  |
|  | $\text{Mg}^{2+} + 2\text{e}^- \rightleftharpoons \text{Mg}$                                                        | -2,37             |  |
|  | $\text{Al}^{3+} + 3\text{e}^- \rightleftharpoons \text{Al}$                                                        | -1,66             |  |
|  | $\text{Mn}^{2+} + 2\text{e}^- \rightleftharpoons \text{Mn}$                                                        | -1,18             |  |
|  | $2\text{H}_2\text{O} + 2\text{e}^- \rightleftharpoons \text{H}_2(\text{g}) + 2\text{OH}^-$                         | -0,83             |  |
|  | $\text{Zn}^{2+} + 2\text{e}^- \rightleftharpoons \text{Zn}$                                                        | -0,76             |  |
|  | $\text{Cr}^{3+} + 3\text{e}^- \rightleftharpoons \text{Cr}$                                                        | -0,74             |  |
|  | $\text{Fe}^{2+} + 2\text{e}^- \rightleftharpoons \text{Fe}$                                                        | -0,44             |  |
|  | $\text{Cd}^{2+} + 2\text{e}^- \rightleftharpoons \text{Cd}$                                                        | -0,40             |  |
|  | $\text{Co}^{2+} + 2\text{e}^- \rightleftharpoons \text{Co}$                                                        | -0,28             |  |
|  | $\text{Ni}^{2+} + 2\text{e}^- \rightleftharpoons \text{Ni}$                                                        | -0,25             |  |
|  | $\text{Sn}^{2+} + 2\text{e}^- \rightleftharpoons \text{Sn}$                                                        | -0,14             |  |
|  | $\text{Pb}^{2+} + 2\text{e}^- \rightleftharpoons \text{Pb}$                                                        | -0,13             |  |
|  | $\text{Fe}^{3+} + 3\text{e}^- \rightleftharpoons \text{Fe}$                                                        | -0,04             |  |
|  | $2\text{H}^+ + 2\text{e}^- \rightleftharpoons \text{H}_2(\text{g})$                                                | 0,00              |  |
|  | $\text{S} + 2\text{H}^+ + 2\text{e}^- \rightleftharpoons \text{H}_2\text{S}(\text{g})$                             | +0,14             |  |
|  | $\text{Sn}^{4+} + 2\text{e}^- \rightleftharpoons \text{Sn}^{2+}$                                                   | +0,15             |  |
|  | $\text{SO}_4^{2-} + 4\text{H}^+ + 2\text{e}^- \rightleftharpoons \text{SO}_2(\text{g}) + 2\text{H}_2\text{O}$      | +0,17             |  |
|  | $\text{Cu}^{2+} + 2\text{e}^- \rightleftharpoons \text{Cu}$                                                        | +0,34             |  |
|  | $2\text{H}_2\text{O} + \text{O}_2 + 4\text{e}^- \rightleftharpoons 4\text{OH}^-$                                   | +0,40             |  |
|  | $\text{SO}_2 + 4\text{H}^+ + 4\text{e}^- \rightleftharpoons \text{S} + 2\text{H}_2\text{O}$                        | +0,45             |  |
|  | $\text{I}_2 + 2\text{e}^- \rightleftharpoons 2\text{I}^-$                                                          | +0,54             |  |
|  | $\text{O}_2(\text{g}) + 2\text{H}^+ + 2\text{e}^- \rightleftharpoons \text{H}_2\text{O}_2$                         | +0,68             |  |
|  | $\text{Fe}^{3+} + \text{e}^- \rightleftharpoons \text{Fe}^{2+}$                                                    | +0,77             |  |
|  | $\text{Hg}^{2+} + 2\text{e}^- \rightleftharpoons \text{Hg}$                                                        | +0,79             |  |
|  | $\text{NO}_3^- + 2\text{H}^+ + \text{e}^- \rightleftharpoons \text{NO}_2(\text{g}) + \text{H}_2\text{O}$           | +0,80             |  |
|  | $\text{Ag}^+ + \text{e}^- \rightleftharpoons \text{Ag}$                                                            | +0,80             |  |
|  | $\text{NO}_3^- + 4\text{H}^+ + 3\text{e}^- \rightleftharpoons \text{NO}(\text{g}) + 2\text{H}_2\text{O}$           | +0,96             |  |
|  | $\text{Br}_2 + 2\text{e}^- \rightleftharpoons 2\text{Br}^-$                                                        | +1,09             |  |
|  | $\text{Pt}^{2+} + 2\text{e}^- \rightleftharpoons \text{Pt}$                                                        | +1,20             |  |
|  | $\text{MnO}_2 + 4\text{H}^+ + 2\text{e}^- \rightleftharpoons \text{Mn}^{2+} + 2\text{H}_2\text{O}$                 | +1,21             |  |
|  | $\text{O}_2 + 4\text{H}^+ + 4\text{e}^- \rightleftharpoons 2\text{H}_2\text{O}$                                    | +1,23             |  |
|  | $\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 6\text{e}^- \rightleftharpoons 2\text{Cr}^{3+} + 7\text{H}_2\text{O}$ | +1,33             |  |
|  | $\text{Cl}_2(\text{g}) + 2\text{e}^- \rightleftharpoons 2\text{Cl}^-$                                              | +1,36             |  |
|  | $\text{Au}^{3+} + 3\text{e}^- \rightleftharpoons \text{Au}$                                                        | +1,42             |  |
|  | $\text{MnO}_4^- + 8\text{H}^+ + 5\text{e}^- \rightleftharpoons \text{Mn}^{2+} + 4\text{H}_2\text{O}$               | +1,51             |  |
|  | $\text{H}_2\text{O}_2 + 2\text{H}^+ + 2\text{e}^- \rightleftharpoons 2\text{H}_2\text{O}$                          | +1,77             |  |
|  | $\text{F}_2(\text{g}) + 2\text{e}^- \rightleftharpoons 2\text{F}^-$                                                | +2,87             |  |

Toenemende sterkte van oksideermiddel

Toenemende sterkte van reduseermiddel