



Hjálparhefti

fyrir EFNA2ME05

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Þetta hefti er eign Verkmennaskólans á Akureyri
og skal notast einungis í prófum.



Jöfnur

$$A=Z+N \quad n = \frac{m}{Mr} \quad C = \frac{n}{V}$$

$$C_1 \cdot V_1 = C_2 \cdot V_2$$

$$K = ^\circ C + 273,15$$

$$\text{ppm} = \frac{\text{massi efnis (g)}}{\text{massi lausnar (g)}} * 10^6$$

$$\text{ppm} = \frac{\text{massi efnis (g)}}{\text{massi lausnar (g)}} * 10^9$$

$$(w/v\%) = \frac{\text{massi (g)}}{\text{rúmmál (mL)}} * 100\%$$

$$(w/w\%) = \frac{\text{massi (g)}}{\text{massi (g)}} * 100\%$$

$$(v/v\%) = \frac{\text{rúmmál (mL)}}{\text{rúmmál (mL)}} * 100\%$$

Grísk töluorð

| | |
|---------|---------|
| 1 mónó | 2 dí |
| 3 trí | 4 tetra |
| 5 penta | 6 hexa |
| 7 hepta | 8 okta |
| 9 nóna | 10 deka |

Fastar

$$R = 0,0821 \frac{\text{atm} \cdot \text{L}}{\text{mol} \cdot \text{K}}$$

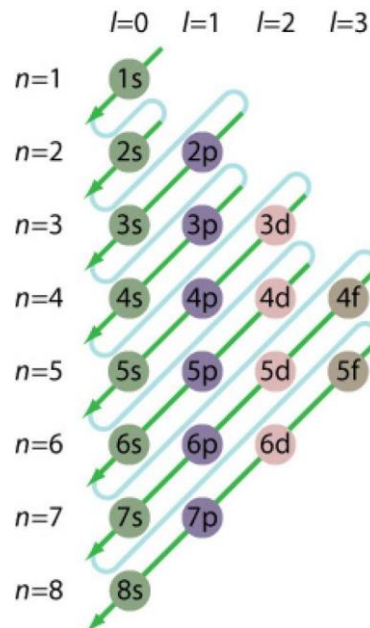
$$R = 8,314 \frac{\text{Pa} \cdot \text{m}^3}{\text{mol} \cdot \text{K}}$$

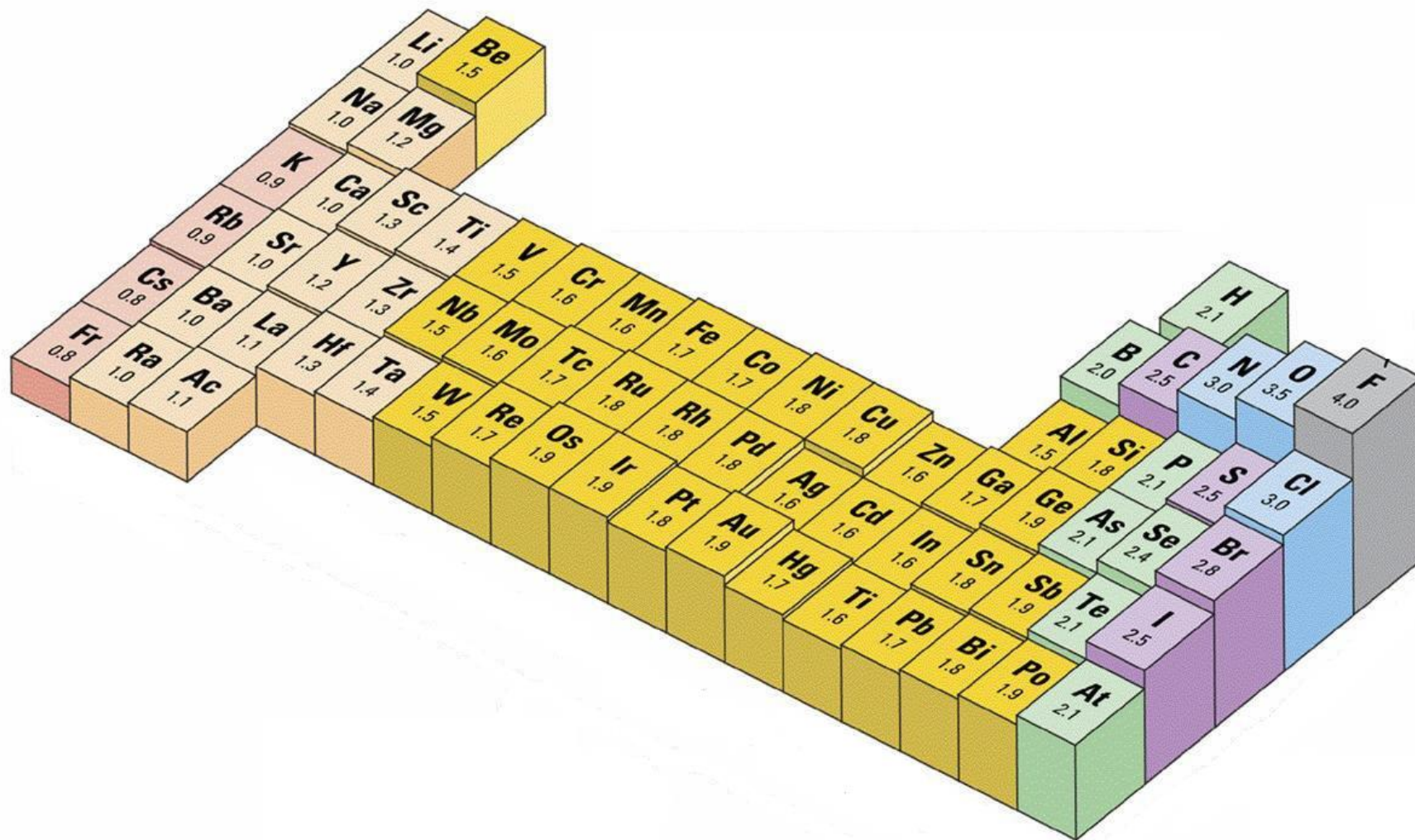
$$R = 62,4 \frac{\text{mmHg} \cdot \text{L}}{\text{mol} \cdot \text{K}}$$

Tala Avogadrosar: $6,022 \cdot 10^{23} \text{ mól}^{-1}$

Einingar SI kerfisins

| Stærð | Nafn einingar | Tákn |
|------------|---------------|------|
| Lengd | Meter | m |
| Massi | Kílógramm | kg |
| Tími | Sekúnda | s |
| Hiti | Kelvin | K |
| Orka | Joule | J |
| Þrýstingur | Pascal | Pa |
| Rafhleðsla | Coulomb | C |
| Efnismagn | Mól | n |
| Ljós magn | Kandela | cd |
| Rafstraum | amper | A |







| | | | | | | | | | |
|---|--|--|---|---|---------------------------------------|---------------------------------------|--|-------------------------------------|--|
| | 1 IA | New Original | | | | | | | |
| 1 | 1 H Vetni 1.00794 | | | | | | | | |
| 2 | 3 Li Litín 6.941 | 4 Be Beryllín 9.012182 | | | | | | | |
| 3 | 11 Na Natrín 22.989770 | 12 Mg Magnesín 24.3050 | 3 IIIB | 4 IVB | 5 VB | 6 VIB | 7 VIIB | 8 | |
| 4 | 19 K Kalín 39.0983 | 20 Ca Kalsín 40.078 | 21 Sc Skandín 44.955910 | 22 Ti Títan 47.867 | 23 V Vanadín 50.9415 | 24 Cr Króm 51.9961 | 25 Mn Mangan 54.938049 | 26 Fe Járn 55.8457 | |
| 5 | 37 Rb Rúbídín 85.4678 | 38 Sr Strontín 87.62 | 39 Y Yttrín 88.90585 | 40 Zr Sirkon 91.224 | 41 Nb Níóbín 92.90638 | 42 Mo Mólybden 95.94 | 43 Tc Teknetín (98) | 44 Ru Rúpen 101.07 | |
| 6 | 55 Cs Sesín 132.90545 | 56 Ba Barín 137.327 | 57 to 71 | 72 Hf Hafnín 178.49 | 73 Ta Tantal 180.9479 | 74 W Volfram 183.84 | 75 Re Renín 186.207 | 76 Os Osmín 190.23 | |
| 7 | 87 Fr Fransín (223) | 88 Ra Radín (226) | 89 to 103 | 104 Rf Rútherfordín (261) | 105 Db Dubnín (262) | 106 Sg Seborgín (266) | 107 Bh Bohrín (264) | 108 Hs Hassín (269) | |

- Alkalímálmur
- Jarðalkalímálmur
- Hliðarmálmur
- Lantaníð
- Aktiníð
- Tregur málmur
- Málmleysingi
- Eðallofttegund

For elements with no stable isotopes, the mass number

The subgroup numbers 1-18 were adopted in 1984 by the International Union of Pure and Applied Chemistry. The names of elements 112-118 are the Latin equivalents of those numbers.

| | | | | |
|---------------------------------------|--------------------------------------|--|-------------------------------------|--------------------------------------|
| 57 La Lantan 138.9055 | 58 Ce Serín 140.116 | 59 Pr Praseóðj/m 140.90765 | 60 Nd Neódým 144.24 | 61 Pm Prómetín (145) |
| 89 Ac Aktín (227) | 90 Th Þórín 232.0381 | 91 Pa Prótaktín 231.03588 | 92 U Úran 238.02891 | 93 Np Neptúnín (237) |



| | | | | | | | | | | | | | | | | | | | | | | |
|-----------|-----------|-----------|-------------|------------|------------|------------|------------|------------|------------|--|--|--|-------------|-----------|-----------|--------------|------------|-----------|--|--|--|--|
| | | | | | | | | | | | | | 18 VIIIA | | | | | | | | | |
| | | | | | | | | | | | | | 2 | 2 | K | | | | | | | |
| | | | | | | | | | | | | | He | | | | | | | | | |
| | | | | | | | | | | | | | Helín | | | | | | | | | |
| | | | | | | | | | | | | | 4.002602 | | | | | | | | | |
| | | | | | | | | | | | | | 13 | 14 | 15 | 16 | 17 | | | | | |
| | | | | | | | | | | | | | IIIA | IVA | VA | VIA | VIIA | | | | | |
| | | | | | | | | | | | | | 5 | 6 | 7 | 8 | 9 | 10 | | | | |
| | | | | | | | | | | | | | B | C | N | O | F | Ne | | | | |
| | | | | | | | | | | | | | Bör | Kolefni | Nítur | Súrefni | Flúor | Neon | | | | |
| | | | | | | | | | | | | | 10.811 | 12.0107 | 14.00674 | 15.9994 | 18.9984032 | 20.1797 | | | | |
| | | | | | | | | | | | | | 13 | 14 | 15 | 16 | 17 | 18 | | | | |
| | | | | | | | | | | | | | Al | Si | P | S | Cl | Ar | | | | |
| | | | | | | | | | | | | | Ál | Kísill | Fosfór | Brennisteinn | Klór | Argon | | | | |
| | | | | | | | | | | | | | 26.981538 | 28.0855 | 30.973761 | 32.066 | 35.453 | 39.948 | | | | |
| 9 | 10 | 11 | 12 | | | | | | | | | | | | | | | | | | | |
| VIIIB | | IB | IIB | | | | | | | | | | | | | | | | | | | |
| 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | | | | | | | | | | | | | |
| Co | Ni | Cu | Zn | Ga | Ge | As | Se | Br | Kr | | | | | | | | | | | | | |
| Kóbolt | Níkkel | Kopar | Sink | Gallín | German | Arsen | Selen | Bróm | Krypton | | | | | | | | | | | | | |
| 58.933200 | 58.6934 | 63.546 | 65.409 | 69.723 | 72.64 | 74.92160 | 78.96 | 79.904 | 83.798 | | | | | | | | | | | | | |
| 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | | | | | | | | | | | | | |
| Rh | Pd | Ag | Cd | In | Sn | Sb | Te | I | Xe | | | | | | | | | | | | | |
| Ródín | Palladín | Silfur | Kadmín | Indín | Tin | Antimon | Tellúr | Joð | Xenon | | | | | | | | | | | | | |
| 102.90550 | 106.42 | 107.8682 | 112.411 | 114.818 | 118.710 | 121.760 | 127.60 | 126.90447 | 131.293 | | | | | | | | | | | | | |
| 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | | | | | | | | | | | | | |
| Ir | Pt | Au | Hg | Tl | Pb | Bi | Po | At | Rn | | | | | | | | | | | | | |
| Iridín | Platina | Gull | Kvikasilfur | Þallín | Blý | Bismút | Pólón | Astat | Radon | | | | | | | | | | | | | |
| 192.217 | 195.078 | 196.96655 | 200.59 | 204.3833 | 207.2 | 208.98038 | (209) | (210) | (222) | | | | | | | | | | | | | |
| 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | | | | | | | | | | | | | |
| Mt | Ds | Rg | Uub | Uut | Uuq | Uup | Uuh | Uus | Uuo | | | | | | | | | | | | | |
| Meitnerín | Darmstaðh | Röntgenh | Ununbín | Ununtrín | Ununquath | Ununpentín | Ununhexín | Ununseptín | Ununocín | | | | | | | | | | | | | |
| (268) | (271) | (272) | (285) | (284) | (289) | (288) | (292) | | | | | | | | | | | | | | | |

er of the isotope with the longest half-life is in parentheses.

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| | | | | | | | | | |
|-----------|-----------|-----------|-----------|------------|------------|-----------|-----------|-----------|-----------|
| 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 |
| Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| Samarín | Evrópin | Gaddólín | Terbín | Dysprósín | Hölmín | Erbin | Túlín | Ytterbín | Lútétín |
| 150.36 | 151.964 | 157.25 | 158.92534 | 162.500 | 164.93032 | 167.259 | 168.93421 | 173.04 | 174.967 |
| 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 |
| Pu | Am | Cm | Bk | Cf | Es | Fm | Md | No | Lr |
| Plúton | Amerkín | Kúrín | Berkelín | Kalifornín | Einsteinín | Fermín | Mendelevh | Nóbelín | Lawrensín |
| (244) | (243) | (247) | (247) | (251) | (252) | (257) | (258) | (259) | (262) |



Helstu einatóma jónir

| Katjónir | hleðsla | | Katjónir | hleðsla | | Anjónir | Hleðsla |
|-------------|------------------|--|-----------------|------------------|--|---------|-----------------|
| Ál | Al ³⁺ | | Króm(III) | Cr ³⁺ | | Brómíð | Br ⁻ |
| Baríum | Ba ²⁺ | | Kvikasilfur(I) | Hg ⁺ | | Flúoríð | F ⁻ |
| Blý(II) | Pb ²⁺ | | Kvikasilfur(II) | Hg ²⁺ | | Fosfíð | P ³⁻ |
| Blý(III) | Pb ³⁺ | | Lípíum | Li ⁺ | | Hýdríð | H ⁻ |
| Gull(I) | Au ⁺ | | Magnesíum | Mg ²⁺ | | Joðíð | I ⁻ |
| Gull(III) | Au ³⁺ | | Mangan(II) | Mn ²⁺ | | Nítríð | N ³⁻ |
| Járn(II) | Fe ²⁺ | | Natríum | Na ⁺ | | Karbíð | C ⁴⁻ |
| Járn(III) | Fe ³⁺ | | Nikkel | Ni ²⁺ | | Klóríð | Cl ⁻ |
| Kalíum | K ⁺ | | Silfur | Ag ⁺ | | Oxíð | O ²⁻ |
| Kalsíum | Ca ²⁺ | | Zink | Zn ²⁺ | | Súlfíð | S ²⁻ |
| Kóbalt(III) | Co ³⁺ | | Strontíum | Sr ²⁺ | | | |
| Kopar(I) | Cu ⁺ | | Tin(I) | Sn ²⁺ | | | |
| Kopar(II) | Cu ²⁺ | | Tin(II) | Sn ³⁺ | | | |
| Króm(II) | Cr ²⁺ | | Vetni | H ⁺ | | | |

Helstu fjölatóma jónir

| Heiti | Jón | Heiti | Jón | Heiti | Jón |
|--------------|----------------------------------|-------------|--------------------------------|----------------|---|
| Asetat | CH ₃ COO ⁻ | Brómat | BrO ₃ ⁻ | Dikrómat | Cr ₂ O ₇ ⁻ |
| Fosfat | PO ₄ ³⁻ | Hýdroxíð | OH ⁻ | Nítrat | NO ₃ ⁻ |
| Nítrít | NO ₂ ⁻ | Permanganat | MnO ₄ ⁻ | Vetniskarbónat | HCO ₃ ⁻ |
| Vetnissúlfat | HSO ₄ ⁻ | Þíósýanat | SCN ⁻ | Klórít(III) | ClO ₂ ⁻ |
| Klórat(V) | ClO ₃ ⁻ | Klórat(VI) | ClO ₃ ⁻ | Krómat(VI) | CrO ₄ ²⁻ |
| Súlfat | SO ₄ ²⁻ | Súlfít | SO ₃ ²⁻ | Sýaníð | CN ⁻ |
| Hýpóklóríð | ClO ⁻ | Vetnsifosat | HPO ₄ ²⁻ | Oxalat | C ₂ O ₄ ²⁻ |
| Ammóníum | NH ₄ ⁺ | Hýdróníum | H ₃ O ⁺ | Karbónat | CO ₃ ²⁻ |

**Torleyst- og auðleyst sölt**

| Auðleyst jónísk sölt | Jón | Undantekning (mynda botnföll) |
|-----------------------|---------------------------|--|
| Sölt sem innihalda: | NO_3^- | Engar |
| | CH_3COO^- | Engar |
| | Cl^- | Ef Ag^+ , Hg^{2+} , Pb^{2+} , er til staðar |
| | Br^- | Ef Ag^+ , Hg^{2+} , Pb^{2+} , er til staðar |
| | I^- | Ef Ag^+ , Hg^{2+} , Pb^{2+} , er til staðar |
| | SO_4^{2-} | Ef S^{2+} , Ba^{2+} , Pb^{2+} , Hg^{2+} , er til staðar |
| Torleyst jónísk sölt: | S^{2-} | Ef NH_4^+ , katjónir alkalímalma, Ca^{2+} , Sr^{2+} eða Ba^{2+} eru til staðar |
| | CO_3^{2-} | Ef NH_4^+ , katjónir alkalímalma, Ca^{2+} , Sr^{2+} eða Ba^{2+} eru til staðar |
| | PO_4^{3-} | Ef NH_4^+ , katjónir alkalímalma, Ca^{2+} , Sr^{2+} eða Ba^{2+} eru til staðar |
| | OH^- | Ef NH_4^+ , katjónir alkalímalma, Ca^{2+} , Sr^{2+} eða Ba^{2+} eru til staðar |

Oxunartölur

| | Oxunartala | | Oxunartala |
|---|-------------------------|-------------|---|
| Frumefni eitt og sér | 0 | Vetni (H) | +1 með málmleysingjum -1 með málmum |
| Flokkur 1 | +1 | Súrefni (O) | Yfirleitt -2 -1 með H_2O_2 |
| Flokkur 2 | +2 | Flúor (F) | Alltaf -1 |
| Halógenar | -1 En með súrefni +1 | | |
| - Summa oxunartalna fyrir hlutlaust (óhlaðna sameind) er alltaf núll - Summa oxunartalna fyrir fjölatóma jón er hleðsla hennar | | | |