Specific Charge & Nasty Nuclear Numbers Practice

Data: magnitude of electron charge: 1.60 x 10-19 C

Unified atomic mass unit: 1.66 x 10-27 kg

|  |  |  |
| --- | --- | --- |
| How Many electrons? | |  |
| Charge | Charge /C | Number of electrons |
| 1C |  |  |
| 2mC |  |  |
| 7μC |  |  |
| 4.6nC |  |  |
| 25pC |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Specific Charge of Nucleus | | |  |  |  |
|  | A | Z | Total Mass /kg | Total Charge / Q | Specific Charge / C kg-1 |
| H | 1 | 1 |  |  |  |
| He | 4 | 2 |  |  |  |
| F | 18 | 9 |  |  |  |
| Fe | 56 | 26 |  |  |  |
| Au | 196 | 79 |  |  |  |
| Pb | 207 | 82 |  |  |  |
| U | 238 | 92 |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Specific Charge of Ions | | |  |  |  |
|  | A | Z | Total Mass /kg | Total Charge / Q | Specific Charge / C kg-1 |
| He+ | 4 | 2 |  |  |  |
| F‑ | 18 | 9 |  |  |  |
| Fe3+ | 56 | 26 |  |  |  |
| Pb2+ | 207 | 82 |  |  |  |

A nucleus of Helium has a specific charge of 6.43 x 107 C kg-1. Calculate the number of neutrons in this isotope.

A nucleus of Uranium has a specific charge of 3.77 x 107 C kg-1. Calculate the number of neutrons in this isotope.

Answers

|  |  |  |
| --- | --- | --- |
| How Many electrons? | |  |
| Charge | Charge /C | Number of electrons |
| 1C | 1 | 6.25E+18 |
| 2mC | 2.00E-03 | 1.25E+16 |
| 7μC | 7.00E-06 | 4.38E+13 |
| 4.6nC | 4.60E-09 | 2.88E+10 |
| 25pC | 2.50E-11 | 1.56E+08 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Specific Charge | |  |  |  |  |
|  | A | Z | Total Mass /KG | Total Charge / C | Specific Charge / C.kg-1 |
| H | 1 | 1 | 1.67E-27 | 1.6E-19 | 9.58E+07 |
| He | 4 | 2 | 6.68E-27 | 3.2E-19 | 4.79E+07 |
| F | 18 | 9 | 3.006E-26 | 1.44E-18 | 4.79E+07 |
| Fe | 56 | 26 | 9.352E-26 | 4.16E-18 | 4.45E+07 |
| Au | 196 | 79 | 3.273E-25 | 1.264E-17 | 3.86E+07 |
| Pb | 207 | 82 | 3.457E-25 | 1.312E-17 | 3.80E+07 |
| U | 238 | 92 | 3.975E-25 | 1.472E-17 | 3.70E+07 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Specific Charge of Ions | | |  |  |  |
|  | A | Z | Total Mass /kg | Total Charge / Q | Specific Charge / C kg-1 |
| He+ | 4 | 2 | 6.68E-27 | 1.6E-19 | 2.40E+07 |
| F‑ | 18 | 9 | 3.006E-26 | (-)1.6E-19 | 5.32E+07 |
| Fe3+ | 56 | 26 | 9.352E-26 | 4.8E-19 | 5.13E+06 |
| Pb2+ | 207 | 82 | 3.457E-25 | 3.2E-19 | 9.21E+05 |