Europa Period: 0.0082 years

Ganymede Semi-major: 0.0070 AU

Callisto Mass: 0.0097 Solar Massses

The period of Europa can be easily converted from days to years by dividing the period in days by the number of days in a year. This gives a resulting period of 0.0082 years. By performing the same calculation on the other rows in the table, one can achieve the same results as are provided. Thus, I agree with the conversions of the values present in the table.

In order to calculate the semi-major axis in terms of AUs, we can convert in a similar manner to the procedures taken to convert the period in years to days. The diameter of Jupiter, 139.82 million meters, is multiplied by the length of the Semi-major axis in terms of Jupiter Diameters. This results in a length for the semi-major in terms of meters. Then, by dividing that product by the number of meters in an Astronomical Unit, 149,597,870,700 meters, one produces the distance of the Semi-major axis in terms of AUs. For Ganymede, this calculation produces a distance of 0.0070 AU.

To calculate the mass of a Jupiter in solar masses, we can apply Kepler’s Third law in order to find the mass of the object from its orbital period (converted into seconds) and its semi-major axis distance (converted into meters). Performing the conversions for Callisto, and after plugging in the relevant constants, we have an equation of [(4 \* pi^2) / (6.674\*10^(-11))] \* [(1824651000)^3 / (432000)^2]. After reducing this, we arrive at a resultant mass of 1.93 \* 10^28 kg. After yet another conversion, this time into solar masses, we find the mass of Callisto to be 0.0097 Solar Masses.

Jupiter’s Mass, calculated by hand for Callisto and provided for the other moons, seems to vary greatly between the data points. The mass calculated for Callisto is a factor of magnitude greater than the next largest mass value. My estimation for where this error arose is from the measurements provided. If we were to compare this set of calculations to the ones performed in the similar lab, Callisto has a very different measured period. In the lab, the period was 16.7 days; a factor of magnitude difference from the data provided in the above table. This appears to be the root of the major outlier in calculated masses of Jupiter. Furthermore, for all the moons, the low level of precision in decimal places means that values will not be totally accurate. The earlier in the calculation process that rounding takes place, the more exaggerated errors will be after arriving at the result. In regards to the variance for the presented mass values, beyond even rounding errors, it is indicative of the inherent problems in measuring objects in space. Measuring must be incredibly precise to find results, and consequently, it would make most sense to average the value to arrive at a more accurate estimate of the mass of Jupiter