

## 7 Unit 0: Unit Conversions

In the first ever lecture of 325, Jon will tell you a bit about himself and then probably show you a slide with different unit conversions. He may even write them on the board. He will then tell you one thing: "These will be on the final in a NO Calculator Closed Book portion of the exam". I can't quite remember which ones he shows in class, but I'll put some relevant ones below for you to look out for. Note that some of the conversion values may be rounded!

### Metric and Imperial Lengths (in/ft/mi $\leftrightarrow$ km/m/cm)

$$1 \text{ in} = 2.54 \text{ cm}$$

$$1 \text{ ft} = 0.305 \text{ m}$$

$$1 \text{ ft} = 12 \text{ in}$$

$$1 \text{ Yard} = 3 \text{ ft}$$

$$1 \text{ Mile} = 1760 \text{ Yards} = 1.609 \text{ km}$$

$$1 \text{ Nautical Mile} = 1852 \text{ m}$$

### Metric and Imperial Mass (lb/slug $\leftrightarrow$ kg/tonne)

$$1 \text{ Slug} = 32.2 \text{ lb}$$

$$1 \text{ kg} = 2.2 \text{ lb}$$

$$1 \text{ Tonne} = 1000 \text{ kg}$$

$$1 \text{ Imperial Ton} = 2240 \text{ lb}$$

$$1 \text{ US Ton} = 2000 \text{ lb} = 907.2 \text{ kg}^4$$

### Metric and Imperial Volume (Gallons/mL/Oz/ $m^3/in^3$ )

$$1 \text{ Gallon} = 231 \text{ in}^3$$

$$1 \text{ Gallon} = 3.785 \text{ L}$$

$$12 \text{ Fluid Oz} = 355 \text{ mL}$$

$$12 \text{ Dry Oz} = 341 \text{ mL}^5$$

$$1 \text{ m}^3 = 1000 \text{ L}$$

### Power Conversions (hp/W/ft-lb/s)

$$1 \text{ hp} = 746 \text{ W}^6$$

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<sup>4</sup>In Mott, they use US Tons

<sup>5</sup>This could be wrong!

<sup>6</sup>Note that some sources say 1 hp = 735.5 W but I believe Jon uses 746 W. But look out for it nonetheless.

$$1 \text{ hp} = 550 \text{ ft} - \text{lb}/s$$

**Temperature Conversion ( $^{\circ}\text{F}/^{\circ}\text{C}/\text{K}$ )**

$$\left(\frac{9}{5}\right)^{\circ}\text{C} + 32 = ^{\circ}\text{F}$$

$$\text{K} = 273.15 + ^{\circ}\text{C}$$

**Pressure Conversion ( $\text{Pa}/\text{lb}/\text{in}^2/\text{atm}$ )**

$$1 \text{ lb}/\text{in}^2 = 6895 \text{ Pa}$$

$$1 \text{ atm} = 101.325 \text{ kPa}$$

**Energy Conversion ( $\text{BTU} \leftrightarrow \text{ft-lb}$ )**

$$1 \text{ BTU} = 778.2 \text{ ft} - \text{lb}$$

*Know all of these by heart and you are guaranteed to get full marks on the first portion of the final exam. You may also grab a few bonus marks in the process! Also, Jon lets you do the conversions in whatever direction you like, so don't worry about the different variations, remember whatever is easier!*