

$$1-6 \quad S = vt - \frac{1}{2}at^2$$

$$[L] = \frac{[L]}{[T]} - \frac{[L]}{[T]} \frac{[T]^2}{[T]}$$

S = DISTANCE (ft)

$$[L] = \frac{1}{[T]}$$

v = FINAL VELOCITY (ft/s)

t = ELAPSED TIME (s)

INCONSISTENT

a = ACCN. (ft/s²)

1-6 "IN 1791 ESTABLISHED THE METRIC SYSTEM, THEY INTENDED THAT THE METER SHOULD BE $\frac{1}{10^6}$ OF THE DISTANCE FROM THE EQUATOR TO EITHER POLE."

* BOTH DEFINITIONS WERE REPLACED BY MORE ACCURATE MEANS. CHECK NEWER BOOKS. (MOST RECENT ONES)

* THE GRAM SHOULD BE ONE CUBIC CENTIMETER OF WATER AT 4°C."

THEN: $29 = 2 \left(\frac{1}{10^6} \right) \text{ cm}^3$ OF WATER AT 4°C

CAR 2 STRUCTURE AND PROPERTIES OF MATTER

THINKERS: { GALILEO + NEWTON + COULOMB + ... }
128/06: { KEYWORD - MARK SEE }

WE PRESUME THAT ALL PROPERTIES OF MATTER ARE, IN PRINCIPLE, ULTIMATELY CORRELATED WITH A RELATIVELY FEW BASIC PROPERTIES OF MATTER, SUCH AS INERTIA, GRAVITATIONAL FORCES, ELECTRIC FORCES, AND NUCLEAR FORCES.

2-1 WHAT IS MATTER?

- FIRST BASIC ATTRIBUTE OF MATTER: "BODY" = INERTIA. MATERIAL BODY HAS INERTIA. THE WORD "MASS" IS USED TO DESCRIBE THE AMOUNT OF INERTIA A BODY HAS.
- WEIGHT: INTERACTION BETWEEN TWO BODIES, GRAVITATIONAL FORCE. IS KNOWN TO FALL OFF RAPIDLY AS THE DISTANCE BETWEEN THE BODIES INCREASES.
- ELECTRIC FORCES: ELECTROSTATIC (COULOMB), MAGNETIC, ELASTIC (SHORT-RANGE ELECTRIC FORCES).
- NUCLEAR FORCES: STRONG-INTERACTION, WEAK-INTERACTION.

2-2 DENSITY AND SPECIFIC GRAVITY

DENSITY = $\frac{\text{MASS}}{\text{VOLUME}}$ (MASS PER UNIT VOLUME)

EXAMPLE 2-1

Block dimensions: 5cm x 7cm x 20cm

MASS = 5 kg

OUT OF WHICH METAL IS THE BLOCK

PROBABLY MADE? R: ZINC

$$1 \text{ kg} = 1000 \text{ g} \quad 5 \text{ kg} = 5000 \text{ g}$$

$$\text{VOLUME} = (5 \text{ cm}) \times (7 \text{ cm}) \times (20 \text{ cm}) = 700 \text{ cm}^3$$

$$\text{DENSITY} = \frac{\text{MASS}}{\text{VOLUME}} = \frac{5000 \text{ g}}{700 \text{ cm}^3} = 7.14 \text{ g/cm}^3$$

* WATER: $\rho = 1 \text{ g/cm}^3$
* ALUMINUM: "LIGHT" METAL.
* LEAD: "HEAVY" METAL.

2/21/03