

1(12 Pts). Complete the following chart, in order from left to right

Isotope	Mass Number	Protons	Neutrons	Electrons
$^{14}\text{N}$	14	7	7	7
$^{40}\text{K}$	40	19	21	19
$^{97}\text{Zr}$	97	40	57	40
$^{40}\text{Ca}^{2+}$	40	20	20	18

2 (5 Pts). Lead has a density of  $11.3 \text{ g/cm}^3$ . What would be the mass of a rectangular block of lead measuring  $2.50 \text{ cm} \times 3.5 \text{ cm} \times 6.2 \text{ cm}$ ? (Show all work to receive credit)

$$V = l \cdot w \cdot h = 54.25 \text{ cm}^3$$

$$\frac{54.25 \text{ cm}^3}{1} \times \frac{11.3 \text{ g}}{\text{cm}^3} = 610 \text{ g}$$

3. (5 Pts). Bromine has density of  $3.12 \text{ g/cm}^3$  at  $25.0^\circ\text{C}$ . Determine the mass of  $48.5 \text{ mL}$  of bromine. (Show all work to receive credit)

$$1 \text{ cm}^3 = 1 \text{ mL} = 1 \text{ cc}$$

$$\frac{48.5 \text{ mL}}{1} \times \frac{3.12 \text{ g}}{\text{cm}^3} = 151 \text{ g}$$

4. (3 Pts) A car averages 28 miles per gallon. Express this in kilometers per liter. ( $1 \text{ L} = 1.06 \text{ quarts}$ ,  $4 \text{ quarts} = 1 \text{ gallon}$ ,  $2.54 \text{ cm} = 1 \text{ inch}$ ,  $12 \text{ inches} = 1 \text{ foot}$ ,  $5280 \text{ ft} = 1 \text{ mile}$ ) (Show all work to receive credit)

$$\frac{28 \text{ mi}}{\text{gal}} \times \frac{5280 \text{ ft}}{\text{mi}} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{2.54 \times 10^{-2} \text{ m}}{\text{in}} \times \frac{1}{10^3} \times \frac{1 \text{ gal}}{4 \text{ qt}} \times \frac{1.06 \text{ qt}}{1 \text{ L}} = 11.9 \frac{\text{km}}{\text{L}}$$

$$12 \frac{\text{km}}{\text{L}}$$

1(12 Pts). Complete the following chart, in order from left to right

Isotope	Mass Number	Protons	Neutrons	Electrons
$^{15}\text{N}$	15	7	8	7
$^{40}\text{Ca}$	40	20	20	20
$^{99}\text{Zr}$	99	40	59	40
$^{87}\text{Sr}^{2+}$	87	38	49	36

2 (5 Pts). Lead has a density of  $11.3 \text{ g/cm}^3$ . What would be the mass of a rectangular block of lead measuring  $4.50 \text{ cm} \times 3.5 \text{ cm} \times 6.2 \text{ cm}$ ? (Show all work to receive credit)

$$V = l \cdot w \cdot h = 97.65 \text{ cm}^3$$

$$\frac{97.65 \text{ cm}^3}{\text{cm}^3} \cdot 11.3 \frac{\text{g}}{\text{cm}^3} = 1100 \text{ g}$$

3. (5 Pts). Bromine has density of  $3.12 \text{ g/cm}^3$  at  $25.0^\circ\text{C}$ . Determine the mass of  $88.5 \text{ mL}$  of bromine. (Show all work to receive credit)

$$1 \text{ cm}^3 = 1 \text{ mL}$$

$$\frac{88.5 \text{ mL}}{\text{mL}} \cdot 3.12 \frac{\text{g}}{\text{mL}} = 276.1 \text{ g}$$

4. (3 Pts) A car averages 18 miles per gallon. Express this in kilometers per liter. ( $1 \text{ L} = 1.06 \text{ quarts}$ ,  $4 \text{ quarts} = 1 \text{ gallon}$ ,  $2.54 \text{ cm} = 1 \text{ inch}$ ,  $12 \text{ inches} = 1 \text{ foot}$ ,  $5280 \text{ ft} = 1 \text{ mile}$ ) (Show all work to receive credit)

$$\frac{18 \text{ mi}}{\text{gal}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot \frac{12 \text{ in}}{1 \text{ ft}} \cdot \frac{2.54 \times 10^{-2} \text{ m}}{1 \text{ in}} \cdot \frac{1 \text{ gal}}{4 \text{ qts}} \cdot \frac{1.06 \text{ qt}}{1 \text{ L}} = 7.7 \frac{\text{km}}{\text{L}}$$