

Answers to Communication Questions

42. (a) 21.5 g
 (b) 58 cm³
 (c) 19.3 kg/dm³
 (d) 17.5 g
 (e) 298
43. Group 1 – alkali metals – soft, gray metals, react with water to produce hydrogen gas
 Group 2 – alkaline earth metals – gray metals, some react with water
 Group 17 – halogens – tend to exist as diatomic molecules
 Group 18 – noble gases – very non-reactive

44.

Atom or ion with mass number	Number of protons	Number of neutrons	Number of electrons
¹⁴ N ³⁻	7	7	10
³² S ²⁻	16	16	18
⁴ He	2	2	2
⁷ Li ⁺	3	4	2
⁴⁰ Ca ²⁺	20	20	18

45. (a) $\text{:}\ddot{\text{A}}\text{r:}$ (b) Na (c) $\cdot\ddot{\text{A}}\text{l}\cdot$
 (d) $\ddot{\text{B}}$ (e) $\cdot\ddot{\text{A}}\text{l}\cdot$ (f) $\ddot{\text{B}}\cdot$
46. (a) $\cdot\ddot{\text{C}}\cdot$ (b) $\cdot\ddot{\text{N}}\cdot$ (c) $\cdot\ddot{\text{O}}\cdot$
 (d) $\text{:}\ddot{\text{F}}\cdot$ (e) $\text{:}\ddot{\text{C}}\text{l}\cdot$ (f) $\text{:}\ddot{\text{B}}\text{r}\cdot$

Pattern 1: Number of valence shell electrons increase across a period (row).

Pattern 2: Number of valence shell electrons stays the same down a group (column).

47. Atomic radius increases going down the periodic table and decreases going across the periodic table.
 Ionization energy decreases going down the periodic table and increases going across the periodic table.
 Electron affinity decreases going down the periodic table and increases going across the periodic table.

48.

Chemical Properties	Physical Qualitative Properties	Physical Quantitative Properties
Reactivity with acids	Colour	Melting point
Flammability	Malleability	Density
Reactivity with air	Hardness	Electrical conductivity
Toxicity	Brittleness	Boiling point

49. (a) $\text{:}\ddot{\text{B}}\text{r:}\ddot{\text{C}}\text{r:}\ddot{\text{B}}\text{r:}$ (b) $\text{H:}\ddot{\text{S}}\text{:H}$ (c) $\begin{array}{c} \text{:}\ddot{\text{C}}\text{:} \\ \text{:}\ddot{\text{C}}\text{:}\ddot{\text{C}}\text{:}\ddot{\text{C}}\text{:} \\ \text{:}\ddot{\text{C}}\text{:} \end{array}$
 (d) $\begin{array}{c} \text{H:}\ddot{\text{A}}\text{s:H} \\ \text{H} \end{array}$ (e) $\ddot{\text{S}}::\text{C}::\ddot{\text{S}}$
50. (a) $\text{A} + \text{B} \rightarrow \text{AB}$
 (b) $\text{XY} \rightarrow \text{X} + \text{Y}$
 (c) compound or element + O₂ → oxides
 (d) $\text{M} + \text{RX} \rightarrow \text{R} + \text{MX}$
 (e) $\text{AB} + \text{CD} \rightarrow \text{AD} + \text{CB}$