

Chemistry 11 (SCH3U)

Culminating Assessment

part A

1. C

2. A

3. E

4. D

5. D

6. C

7. E

8. A

9. A

10. B

11. C

12. C

13. C

14. D

Part B

1. Dipole-dipole interaction - b

Covalent bond - e

2. The reactivity of gas atoms in group 17, the halogens decreases down the group because atomic radius increases in size with increasing electronic energy levels. The reactivity of atomic metals in group 1 increases down the group because the atoms becomes larger, thus the outer electrons are far from the nucleus. The force of attraction between the nucleus and electrons decreases.

1. Metal carbonate - d

Acid - c

1. Complete combustion leads to the release of the maximum energy from a fuel that is being reacted while incomplete combustion is reaction between oxygen and fuel and results in carbon monoxide, carbon, and water.

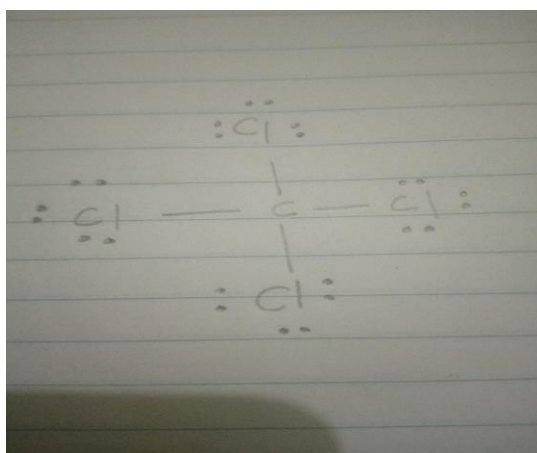
1. Homogenous - b

Precipitate - c

2. A standard solution is a solution with a known concentration of an element or substance.

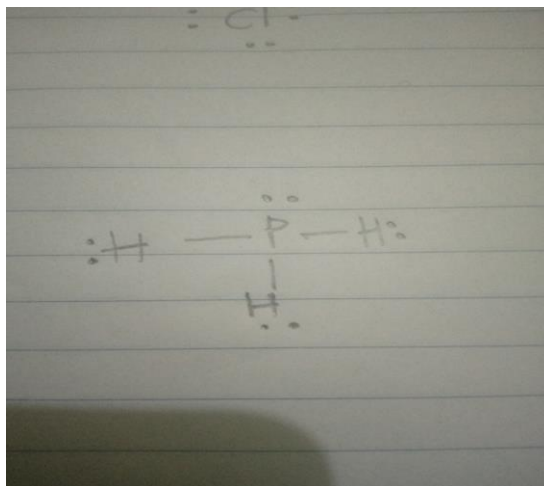
Part C

1. Electronegativity of CCl_4 is; Cl = 3, C = 2.5. Difference is 0.5



Lewis molecular diagram is

Electronegativity of PH_3 is; P = 2.19, H = 2.20. Difference is 0.01



Lewis molecular diagram is

2a. Calculate relative atomic mass of element that is

0.0050000 % of isotope mass 234.040947 u, 0.72000 % of isotope mass 235.043924 u, and 99.275% of isotope mass 238.050784 u.

$$= (0.005 \times 234.040947) + (0.72 \times 235.043924) + (99.275 \times 238.050784) \div 100$$

$$= 238.0289$$

2b. Uranium. Has 238 protons

3a. $\text{Mn}(\text{CNO})_4$ - manganese cyanate

b. $\text{Al}_2(\text{SO}_3)_3 \cdot 3\text{H}_2\text{O}$ - aluminum sulfite

c. N_2O - nitrous oxide

d. H_2SO_4 (aq) - sulfuric acid

e. Fe_2O_3 - iron III oxide

f. F_2 - Fluorine

4. CaO (s) + H_2O (L) $\rightarrow$ CaOH_2 (s)

b. Na (s) + CuSO_4 (aq) $\rightarrow$ Na_2SO_4 (s) + Cu (s)

5a. CuSO_4 (aq) + Na_2HPO_4 (aq) $\rightarrow$ $\text{Cu}_3(\text{PO}_4)_2$ (s) + Na_2SO_4 (aq)

b. Combustion of Liquid C_8H_{18} forms CO_2 (g) + H_2O (L)

6a. Mass of N_2 is 18.5

b. Yield = $(17.9/18.5) \times 100 = 96.75\%$

7. Hydrocarbon is 86.5% carbon and 14.4% Hydrogen, empirical formula is

$$86.5 \times 1/12 = 7.2 \text{ mols}$$

$$14.4 \times 1/1 = 14.4 \text{ mols}$$

Formula is $\text{C}_{7.2}\text{H}_{14.4}$

$$14.4 \div 7.2 = 2$$

CH₂

7b. Molecular formula is C_nH_{n+2}

8a. Amount of retinol in mols is 0.475 mols

b. Molecules = 197.916

c. Atoms present = 51

9a. 250

b. saturated because the concentration is within the saturation curve

10. $\text{g/mol} = 63.01$

Final Vol = 500ml

Mass of nitric acid = 11.026 g

b. Concentration = 0.35mol/l

c. $\text{HNO}_3(\text{aq}) + \text{NaOH}(\text{aq}) \rightarrow \text{NaNO}_3(\text{s}) + \text{H}_2\text{O}(\text{L})$

Net ionic equation is $\text{HNO}_3(\text{aq}) + \text{NaOH}(\text{aq}) \rightarrow \text{NaNO}_3(\text{s}) + \text{H}_2\text{O}(\text{L})$

Total ionic equation is strong acid + base forms salt and water

Spectator ions are sodium and nitrate ions

11. pH of a 0.008 mol/L solution sample of $\text{Ba}(\text{OH})_2(\text{aq})$ at 25 degrees Celsius is

11.27